

# **GROUP TUBEWELL:**

**AN ORGANISATIONAL ALTERNATIVE TO VERY SMALL FARMERS'  
IRRIGATION IN EAST GANGETIC PLAINS**

**(A Report)**

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## Preface

The study is an outcome of a small budgeted research project financed by the Institute. Mr. Ravi Prakash Rai joined the research project in the capacity of the Research Assistant. However, as the work advanced, I decided to share the authorship with Mr. Rai on account of his close collaboration and active involvement in the research work.

My friendship with Dr. Robert Chambers since early 1981, developed my interest in ground water which culminated in the initiation of this study. I am most grateful to him for inspiring me to undertake this study. The cooperation of large number of informants - group tubewell members, non-members, VASFA and INADP staff and other informants were responsible for the completion of this study. I and Mr. Rai express our gratitude to all of them for their cooperation. The typing work of the report was most ably handled by Mr. P.J. Devassykutty. He was doing this work along with another report of mine. The typing of the report had to be done in a very short span of time as I had to leave Giri Institute to join my new assignment in USAID, New Delhi. However, he completed the task well in time. Our thanks are to him.

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NIRANJAN PANT

## CHAPTER I

### Introduction

The problems of small farmers<sup>1</sup> have been a subject of discussions, debates and controversies since the beginning of plan era. Constituting as they do, a large proportion of agriculture sector, particularly, in terms of number if not area, it is natural that they have acquired an important place in the documents of the Planning Commission and State Planning Boards. One of the chief concerns of the Indian government in the recent years has been to provide irrigation facility to small farmers so that they could make maximum use of their meagre land. However, the irrigation problem of small farmers is not uniform all over India and is conditioned by the environment in which they inhabit. As a result the solutions are also not the same for all over the country. This study, although discusses the problems and issues related to small farmers, concentrates on small farmers who inhabit in the eastern part of Gangetic plains, i.e. Eastern Uttar Pradesh, Bihar and West Bengal and recommends group tubewell as the most appropriate solution for the irrigation problem of small farmers with numerous fragmented holdings in these regions. Some successful experiments of group tubewells in Eastern U.P. and North Bihar is also described in detail to substantiate the proposition.

### Small Farmers

According to the Agricultural Census (1976-77), over half (54.6%) of the total operational holdings in India are of a size of less than one hectare of land and constitute only 10.7 per cent of the total area of land operated. If we combine these marginal holdings with small holdings (1 to 2 hectare), we find that 72.6 per cent of holdings fall in this group and it contains 23.5 per cent of the total area.<sup>2</sup> With the increase in the pressure of population over the land, the number of small holdings (this includes marginal ones) has increased, although their average size has not changed much. Whereas in 1960-61 holdings of less than five acres accounted for 62 per cent of the holdings and 18.5 per cent of the total cultivated area in India, by 1976-77 they accounted for, as pointed out earlier, 72.6 per cent of the holdings and 23.5 per cent of the cultivated area. The most dramatic changes took place for holdings of less than one acre. Whereas in 1960-61 they accounted for only 18 per cent of the holdings, by 1970-71 they increased to 33 per cent. This indicates an increase of 155 per cent in number of holdings and 219 per cent in the area.<sup>3</sup>

Although small holdings consist of about 23.5 per cent of the operational area, their share in the net irrigated area (31.4%), fertilizer consumption (32%), institutional credit (33%) and total assets (34.5%) is around one-third in each case. It means small farmers have more productive assets and

inputs per unit of land. However, the favourable factor gets diluted when we consider the fact that they constitute 72.6 per cent of households which reduces the value of assets and inputs per household in comparison to bigger farmers leading to a lesser income per household<sup>4</sup> and ultimately causing a resource constrain. To combat the size constrain the small farmer makes more efficient use of his land. It is borne out by the fact that they do multiple cropping and make more use of irrigation in their cultivation. Although only 9 per cent of the cultivated area is multiple-cropped in India, there is an inverse relationship between multiple cropping and farm size. It is 27 per cent for farm size under 1 acre, 16 per cent for farm size under 5 acres and 1 per cent for the farm size of 25 acres and above.<sup>5</sup> We also find an inverse relationship between the size of landholding and percentage of irrigated area to net sown area. While the percentage for India as a whole for all sizes is 21.4, it is 33.8 per cent for less than one hectare and 13 per cent for 10 hectare and above.<sup>6</sup>

The population pressure on land has reduced the average size of the operational holding in India considerably during 1961-77. The average size which was 2.6 hectare in 1961-62 went down to 2.3 hectare in 1970-71 and came further down to 2 hectare in 1976-77.<sup>7</sup> Coupled with it is the fact, earlier mentioned by us, that there is a drastic increase in the number of small holdings. Under these circumstances, the best course

of action left is to increase in productivity and multiple cropping. Judging from the international standard there is lot of scope for increasing the productivity which can be doubled or trippled.<sup>8</sup> This can also be done by making greater use of the little land available to small farmers, through multiple cropping. This means the use of land to grow two or even three crops per year. In order of importance the most necessary condition for multiple cropping or increase in the productivity of a crop in a geoclimatic condition like India, is availability of assured and adequate water supply for irrigation

#### State Interventions

To cope up with the problems of small farmers, state intervention in the form of Small Farmers' Development Agencies (SFDAs) was made in 1971. It aimed at improving the lot of this category of farmers by making preferential arrangements in the supply of inputs to them. It was done because there was a realisation among the policy makers that credit, which is a precondition to all kinds of inputs, was not available to small farmers at a reasonable rate of interest. The SFDAs were expected to identify eligible beneficiaries and prepare suitable schemes for them. The identified persons were to be given subsidies upto 25 per cent in case of small farmers and 33 per cent in case of marginal farmers<sup>9</sup> for the investment in programmes such as irrigation, land development, soil conservation, animal husbandry, etc. The programme had



covered 1818 blocks in the country by the end of 1977-78.

The programme underwent a conceptual change and a modified programme namely Integrated Rural Development (IRD) programme was introduced on an expanded scale in 1978-79 beginning with 2300 blocks of which 2000 were under coterminus coverage with SFDA, Drought Prone Area Programme and Command Area Development Programme. Another 300 blocks were added to it in 1979-80. This programme was intended to assist the rural population to derive economic benefits from the developmental assets of each area and it emphasized family rather than individual approach in identification of eligible beneficiaries. The necessity of IRD Programme was felt because it was realised that various developmental programmes operated through multiple agencies were not fruitful. It was felt to replace it by one single integrated programme operative throughout the country. Conceptually this programme was comprehensive in scope and sought to secure, through a process of block level planning, fuller exploitation of the local growth potential with a view to make an optimum impact on the local poverty situation. However, the Sixth Five Year Plan concedes that the programme has tended to operate on the same lines as SFDA.<sup>10</sup>

An evaluation of SFDA and MFAL (Marginal Farmers and Agricultural Labourers) programme conducted by Programme Evaluation Organization (PEO)<sup>11</sup> of the Planning Commission found that proper care had not been exercised in the selection



of some of the Project areas. The progress of identification was slow in most areas. The overall percentage of the target groups identified in the projects covered by the study was nearly 34. The performance of MFALs was particularly poor in this regard. It was also found that the benefits of the schemes accrued to wrong persons to the extent of about 9 per cent both in SFDAs and MFALs Projects. The evaluation concluded that generally not much effort had been made to give adequate publicity to the project programmes. As a result, the general awareness about them among the target groups was not high.<sup>12</sup>

In all, there were about 8.03 lakhs beneficiaries under various programmes out of whom about 5.14 lakhs were under SFDAs and about 2.89 lakhs under MFALs. The study found that 73 per cent of beneficiaries had participated in agriculture programmes, nearly 14 per cent in schemes relating to minor irrigation and about 7 per cent each in programmes pertaining to subsidiary occupations and rural works : the four broad groups under which the programmes prepared by the Project Agencies fell. While the percentage of participants of agricultural programmes in SFDAs and MFALs areas was more or less the same, it was higher in SFDAs (about 20 per cent) in case of minor irrigation as compared to 3 per cent in MFALs. Among the agricultural programmes the highest percentage (84.5) of beneficiaries were on account of supply of inputs. Programmes pertaining to minor irrigation benefited the second largest number of farmers in the Project areas. Nearly one out of

every eight (13%) beneficiaries of various programmes had taken advantage of minor irrigation schemes. Of the various schemes under this group, dug-wells had the maximum number of beneficiaries amounting to about 40 per cent in SFDAs and about 61 per cent in MFALs. Tubewell had about 22 per cent beneficiaries in SFDAs compared to 2 per cent in MFALs. Installation of pumpsets had about 13 per cent of beneficiaries in both, while community irrigation had about 9 per cent beneficiaries under SFDAs and about 20 per cent under MFALs.<sup>13</sup>

A seminar attended by senior administrators which discussed the experiences of the SFDAs in different parts of the country in June 1978 in Indian Institute of Management, Ahmedabad, concluded : "In one word, the experience of the different SFDAs regions is that the agency could improve the economic conditions of the poor, although to a very limited extent."<sup>14</sup> The findings of an evaluation study of the working of SFDAs/MFALs in Fatehpur, Rae Bareli and Badaun districts of U.P. conducted in 1976 are very damaging as far as the working of these agencies is concerned. Although the authors of the study do not interpret their findings and the data to this effect but if we compare the participants and non-participants in terms of their landholdings, assets and incidence of indebtedness, it makes obvious that the recipients were not the ones who deserved it most. The comparison reveals that the average size of land of the participants was higher than that of the non-participants. In Badaun it was 4.28 acres for the beneficiaries compared to 2.99 acres for the non-participants. The

participants were indebted (excluding the amount borrowed through the agency) to a considerably lesser extent and their assets (excluding the SFDA's assistance) valued much more in comparison to those of non-participants. The study also reveals that the irrigated area of about 39 per cent participants in three districts taken together was above 3.33 acres which was the prescribed upper limit for the subsidy before June 1974.<sup>15</sup>

The IRD programme is no different from the earlier operating programmes as far as the percolation of benefits of the schemes to the intended beneficiaries is concerned. There is a wide spread feeling that the recipients of the benefits of the programme are not the ones who deserve it most and in some cases the benefits have gone to the affluent section of the rural society. The following two cases reported in the newspapers illustrate this contention very vividly : (i) "A loan meant for those below the poverty line, and a millionaire among the takers - yes in Katsari village in Madhya Pradesh. The millionaire, ex-Sarpanch, Gagraj Singh, of Katsari in the Sanchi Development Block, who owns 55 acres of land besides houses, has been sanctioned loan under the IRD scheme, for digging a well and installing a pump."<sup>16</sup> (ii) "Four Harijans of Maghi village (Pratapgarh district) who had been sanctioned Rs.3000 each for purchasing buffaloes under the IRD scheme were cheated by some influential high caste persons recently. An enquiry revealed that the buffaloes purchased in the name of the loanees were being used by others. The loanees

had neither received the money nor the buffaloes. The General Manager of the District Cooperative Bank had lodged a report to the police against three persons, including the administrator of a cooperative society."<sup>17</sup>

### Gangetic Plains

The States of Uttar Pradesh, Bihar and West Bengal preponderate in the number of small holdings. These three states together contain about 39.47 per cent of the total operational holdings in India. However, their share of small holdings is much bigger. The three states together contain about half (50.50%) of the marginal holdings (upto 1 hectare) and about 46.50 per cent of the small (upto 2 hectares) holdings of the country. The percentage of small holdings in relation to total holdings in these three states is very high. It is 85.76 per cent in U.P., 84.61 per cent in Bihar and 87.06 per cent in West Bengal. Similarly in case of marginal holdings also, while 54.62 per cent holdings fall in this category at the all India level, the percentage is 69.37 in case of U.P., 72.62 in case of Bihar and 66.50 in case of West Bengal. As a result of preponderance of small and marginal holdings in the three states, the average size of the holdings is comparatively quite small being 1.05 ha. in U.P., 1.11 ha. in Bihar and 0.99 ha. in West Bengal compared to all India average of 2.00 ha.<sup>18</sup>

This brings us to the question of sources of irrigation in the region and the desirability of a proper mode of irri-

gation which could serve the purpose of small farmers in these states forming a part of the East Indo-Gangetic plains. Among the surface modes of irrigation, the net-work of major and medium canals is spread all over the region. However, the unreliability of water in terms of adequacy and timings hits the small farmers hardest. The other modes of surface irrigation are ponds and tanks which are generally rainfed. These are of considerable importance in Bihar and West Bengal. However, on account of neglect and nonmaintenance by the State governments, the traditional modes of surface irrigation are losing importance. Besides, these are, by and large, utilized for kharif crops and the water generally does not last for rabi crops. Ground water is the other important source of irrigation in these states. The three states together contain 46.25 per cent of the ultimate and 46.11 per cent of the unutilized ground water in the country.<sup>19</sup> The massive resource is being utilized all over the Indo-Gangetic plains from the time immemorial with various kinds of traditional lift irrigation techniques using human or animal energy. However, with the advent of tubewell technology and particularly since the emergence of HYV seeds, tubewell has become the most important mode of irrigation in the Indo-Gangetic plains. The reason for the development of tubewell in this region is that tubewell is technically feasible only in unconsolidated formations with sandy aquifers and the states covered by the Indo-Gangetic plains have abundance of unconsolidated formations.<sup>20</sup> According to the Agricultural Census of India, 1970-71, in terms of



area under tubewell irrigation, the position of the five states covered by Indo-Gangetic Plains is as follows : U.P. (51.7%), Punjab (26%), Haryana (10.6%), Bihar (5.8%) and West Bengal (0.7%). These states, excluding West Bengal, account for about 94 per cent area under tubewell irrigation. In terms of per cent area irrigated by tubewell to the total irrigated area in these states Punjab occupies first position with 44.1 per cent followed by U.P. (34.9%), Haryana (32.3%), Bihar (12.7%) and West Bengal (4.3%).<sup>21</sup>

Although in comparative terms the development of tubewell irrigation in the eastern region of Indo-Gangetic plains is much less compared to its western counterpart, but whatever development has taken place in this region, the tubewell water is out of the reach of small farmers either because the initial investment costs are too high (as in case of private tubewells) or because for economic and political reasons and consequently prevailing power theory of distribution, they are the last to receive water (as in case of public tubewells). As a result, the benefits to the small farmers have been meagre and are coincidental rather than a matter of deliberate policy.

According to Dhawan, U.P. farmers have started preferring tubewell to dug-well which is borne out by the fact that there is a steep deceleration in the growth of dug-well in recent times. He asserts that tubewells have become not only the principal mode of ground water irrigation in U.P. but also the single most important source of irrigation and has overtaken

canal irrigation which dominated for long time irrigation scene in North India in general and U.P. in particular. However, U.P. is neither a small nor a homogenous state and tubewell irrigation is confined to plains - comprising West, East and Central U.P. The reason for the development of tubewell in this part of the country because only in this region the tubewell technology is feasible. Even within the plains the development of tubewell irrigation is not uniform. During 1975-76, west U.P. accounted for about 58 per cent tubewell irrigation of the state, almost twice the share of east U.P. and six times that of central U.P.<sup>22</sup> The unequal development of tubewell irrigation which Dhawan notices in the Eastern and Western regions is not confined to U.P. alone. On further examination he finds that the development of tubewell irrigation in the alluvial Gangetic plains, which are the great reservoir of valued ground water resource, the level of tubewell development diminishes in force as one moves West to East, i.e. towards Bihar and West Bengal.<sup>23</sup> This is in spite of the fact that there is no dearth of available untapped ground water in these states.<sup>24</sup> This pattern, according to Dhawan, coincides with a like pattern in the matter of agricultural growth. This downward trend as we go to the east is on account of several factors such as progress in land consolidation, spread of rural electrification, institutional support and finance. As we go to the western part of the plains, we find regions are favourably disposed to in terms of these factors resulting in a variable degree of indivisibility of

tubewell (in terms of land size) which goes on increasing as we go to the east from the west.<sup>25</sup>

This brings us to the question of optimum utilization of ground water in the Eastern part of Indo-Gangetic plains. The development of tubewell irrigation has been slow in this region due to various reasons. The reasons other than those mentioned by Dhawan are, agricultural practices are not highly productive and are based on traditional varieties of grain, heavier rainfall which is stored in the tanks and ponds, etc. As a result, need for irrigation is less obvious and the incremental benefits fewer. In addition, land holdings are much smaller and are fragmented all over. So there are fewer farmers for whom even the smallest private tubewell is a viable investment.

Ground water development through lift irrigation provides a wonderful opportunity for the exploitation of massive untapped ground water resource, particularly in Eastern part of Indo-Gangetic plains. The estimation of available ground water based on state level surveys and recalculations by State Ground Water Organizations on the basis of new norms support this contention. According to traditional estimates appearing in various government documents and reports, about 58 per cent of ground water has been utilized in India by 1980-81 and about 42 per cent remains to be utilized. On the contrary, the new estimates indicate that about 30 per cent of ground water has been extracted and about 70 per cent of it remains to be deve-



loped. Although, ground water position in general has improved as a result of evaluation by new norms but in certain states, e.g., Haryana and Punjab ground water extraction has reached a dangerous situation. In Haryana, according to new estimates, the ground water withdrawals have exceeded the recoverable recharge component resulting in overdraft situation (105%). In Punjab ground water extraction is 91 per cent of the component recoverable recharge. Apart from these two states there is no constraints on further ground water utilization in other states presently. As a matter of fact, the scope of ground water development has broadened considerably. The new estimates indicate that in U.P. only 38 per cent of ground water potential has been utilized against about 74 per cent as per traditional estimates. However, in case of Bihar there is marginal increase in the available ground water for extraction while in case of West Bengal there is marginal decrease in its availability.<sup>26</sup>

Ground Water to Small Farmers : Technology and Organization

Growth of ground water utilization is tremendous since the beginning of Plan era. In 1951 the ground water irrigated area was about 6.50 million hectares but after that ground water exploitation has been at an accelerating pace. The annual incremental addition to ground water irrigated area now is of the order of 1.25 million hectares (target for 1979-80) as against 0.18 million hectares during the First and Second Five Year Plan periods, 0.44 million hectares during

Third Plan, 0.80 million hectares during Fourth Plan.<sup>27</sup>

However, the main beneficiaries of the ground water have been larger farmers on account of either their resource base or accessability to credit and thus their ability to use the new seed-water fertilizer technologies. Benefits to the poorer people have been coincidental rather than a matter of deliberate policy, and are much less than what they might have been. Therefore, a well directed effort to make the benefits of ground water available to the small farmers is the most urgent need of the hour. This brings into fore two questions. First, what is the room for manoeuvre in public policy to off-set the balance in favour of the small farmers and second, what feasible combination of technology and organization can benefit the small farmers. These questions were discussed in considerable detail in a four week seminar in the context of South Asia, particularly India and Bangladesh. It provided suggestion to work on two fronts : first, improvement in traditional lift irrigation devices relying predominantly on human and animal energy source. Second, developing and improving new small scale technology especially designed for small farmers. Such technology included both, hand or bicycle powered pumps, relying on human energy; and solar powered micro-pumping units designed especially for very small farmers. The seminar examined in detail case studies from Bangladesh, West Bengal and Tamil Nadu. On the basis of these cases and from other experiences and evidences seminar considered safeguarding the questions related

to the interests of the poor. The approaches it suggested for the purpose had implications for policy and research and included : 'Zoning' of technologies to protect those which are best adopted to the needs of poor, shifting the balance of subsidies in their favour, redirecting research towards the improvement of simple and indigenous irrigation devices, giving the poor priority to access new sources of water and restraint on the part of international and bilateral agencies in the disbursement of funds for the techniques with which they are familiar.<sup>28</sup>

B.D. Dhawan who has taken up the question of ground water development in the eastern region thinks that private tubewell owners in this region can impose serious short-run, if not long run diseconomies on owners of traditional dug-wells, who co-exist here and are generally small and marginal farmers. In addition the limited development of private tubewell irrigation he asserts, would further accentuate the already high inequities in wealth and income. The author's solution lies in the fulfilment of two conditions. First, direct intervention by the state in tapping the ground water in a major way. Second, attainment of the level of efficiency in state tubewell system so that it can deliver water to small and marginal farmers at a cost below the cost of traditional irrigation, leading to a switch over from dug-well to state tubewell irrigation. The first condition can be met no doubt, but the second condition is difficult to obtain in the light of the working of public sector enterprises in India, in general,

and in U.P. in particular.<sup>29</sup> In a recent study figures of running hours of 36 state tubewell in Allahabad district of U.P. were collected for a period spread over April 1980 to February 1981 i.e. a total of 8016 hours. The study found that average running came to 1055.56 hours (13.17%) which was 35 per cent of the standard capacity of 3000 hours per year an average tubewell was supposed to run. The main cause of non-running of tubewells was power shortage leading to intermittent power supply by rostering method. Average loss due to this reason was 70 per cent of the total time. The other major reason was machanical defects in the tubewell which accounted for 6.7 per cent of the total time. It was also found that the discharge force of tubewells in general showed a decreasing trend. Thus, on the one hand, power shortage, machanical defects, and decreasing discharge force lead to a short supply of water through these tubewells. On the other hand, there was an increase in the demand for water due to introduction of HYV seeds and greater intensity of cropping. As a consequences water became a valued scarce resource, therefore, its distribution is also skewed in favour of richer and bigger farmers. The author has cited several instances of discrimination against the poor in favour of rich in the distribution of water. He concludes, "under utilization of tubewells has not only affected agricultural production but it has also resulted in huge losses to the exchequer. The annual loss on the working of State tubewells in U.P. was Rs.34 crores in 1980 and was estimated to be Rs.37 crores in 1981-82."<sup>30</sup>

The findings of a review conducted by the Comptroller and Auditor General of India are no less different. The review covers the performance of the State tubewells from 1974-75 to 1980-81 and is based on the data collected from the office of the Chief Engineer (Tubewells) and a test check of the records of 25 tubewell divisions out of 55 divisions and 7 Rigs divisions out of 12 divisions. According to the review, the main problem has been shortage of power. Consequently, the performance of State tubewells remained poor and the Department continued to incur huge losses on their working.<sup>31</sup>

The departmental norms regarding the number of running hours and the area to be irrigated by each tubewell are 3000 hours (i.e. 34.2 per cent of the total number of hours) per year and 120 hectares respectively. However, during 1974-75 to 1980-81, the tubewells ran for only 17.8 per cent of the total number of hours mainly due to closure on account of hydel defects (41.6%), other mechanical and civil defects (4.3%) and no demand for water (36.3%). The total area irrigated during this period was 63.8 lakh hectares (i.e. 53.2 per cent of the envisaged 119.98 lakh hectares). There was a declining trend after 1976-77 both in the annual average number of running hours per tubewell (from 2297 in 1976-77 to 1016 in 1980-81) and the area irrigated per tubewell (from 77 hectares in 1976-77 to 45.8 hectares in 1980-81) mainly due to increase in hydel defects. The department stated (September 1981) that due to restricted supply of power it had not been possible to utilise the full capacity of the tubewells.<sup>32</sup>



The net loss per tubewell increased from Rs.14599 in 1976-77 to Rs.25999 in 1980-81, the total loss being Rs.157.71 crores during this period. Even after allowing for the closure of State tubewells for 42 per cent of the total number of hours due to hydel defects, the loss attributable to the Irrigation Department amounted to Rs.77.90 crores. Due to reduction in the area irrigated per tubewell after 1976-77 and increase in the annual working expenses, the cost of irrigation per hectare has gone up from Rs.193.64 in 1976-77 to Rs.504.45 in 1980-81.<sup>33</sup>

The following is the summing up given by the review :

- i) At the end of 1980-81, out of 21143 tubewells drilled, 3215 remained uncommissioned.
- ii) The total area irrigated by the State tubewells during 1974-75 to 1980-81 viz., 63.8 lakh hectares was only 53.2 per cent of the envisaged irrigation. There was a declining trend after 1976-77 in the average number of running hours and the area irrigated per year by each tubewell mainly due to hydel defects.
- iii) The loss per tubewell rose from Rs.14599 in 1976-77 to Rs.25999 in 1980-81. During 1976-77 to 1980-81, the total loss amounted to Rs.157.71 crores.
- iv) The cost of irrigation per hectare rose from Rs.193.64 in 1976-77 to Rs.504.45 in 1980-81 due to decline in the area irrigated per tubewell and increase in the annual working expenses.

- v) In 1980-81 the average expenditure on maintenance and repairs of a tubewell was Rs.3850 as against the norm of Rs.3000 fixed by the State Government. In 25 divisions, Rs.173.71 lakhs were spent on motors burnt during 1974-75 to 1980-81.
- vi) In 15 divisions, 152 State tubewells (cost - Rs.127.48 lakhs) failed prematurely after running less than one-third of their normal life and were abandoned during 1974-75 to 1980-81.
- vii) During 1974-75 to 1980-81, large scale thefts of motors and other articles worth Rs.27.18 lakhs and heavy shortages of materials worth Rs.14.84 lakhs connected with the State tubewells occurred. The matter was reported to the Government in November 1981; reply was awaited (February 1982).<sup>34</sup>

Given this state of affairs Dhawan's suggestion of exploitation of ground water through big size state tubewells to reduce inequity and promote growth does not hold a promising prospect. Further, it does not guarantee that the irrigation benefits of these tubewells would go to the small farmers and they would not be discriminated against the rich.

A variant of state tubewell with lots of technological perfection in the distribution system to serve the interest of small farmers with the World Bank support is being tried in U.P. The pilot scheme with 500 such tubewells was started from April 1980 in 12 districts of the State. The supposed

success of this pilot experiment has earned India a 35.3 million dollar loan from the International Fund for Agricultural Development (IFAD) and 93 million dollar from the World Bank to finance the second tubewell project in U.P., involving installation of 2200 tubewells and upgrading of 750 existing tubewells, benefiting about 440000 families in 20 districts of U.P. three of which were already in phase one.<sup>35</sup> The distinguishing features of the World Bank funded tubewells are as follows :

(i) provision of independent feeder of power supply for the electric sub-station from which the project tubewell gets a power supply of 16 to 18 hours per day. (ii) Distribution of water through 8" PBC underground pipe to reduce friction losses to a quarter. (iii) The 100 hectare command of each tubewell has been divided in two equal blocks and each block is subdivided into seven equal parts to match with seven days rotation of water enabling strict observance of Warabandi. (iv) Appointment of part-time tubewell operators belonging to the same village to reduce maintenance cost and elimination of corrupt and grafty practices. (v) Participation of farmers through 14 committees (one for each part in the two sides) of different parts of the tubewell and one tubewell management committee. (vi) Important preventive measures against electrical and mechanical shutdowns in the tubewell.

On account of various technological refinements the cost of a project tubewell with 1.5 cusec discharge commanding 100 hectares comes to about 3.5 lakhs compared to 2.12 lakh in case of an ordinary state tubewell with the same discharge and commanding about 12½ hectares.



In spite of all the claims of successful working, the two tubewells visited by one of the authors in the month of May 1982 in Lucknow district<sup>36</sup> revealed that the supply of electricity was 6 to 8 hours per day and Warabandi was not adhered to by the farmers although project authorities had prepared plans for 7 day Warabandi. Further enquiry from the farmers revealed that there no consolidation of holding was done in the commands of both the tubewells and the holdings of farmers were fragmented and scattered. As a result, the farmers did not observe Warabandi and they took water to suit their convenience. The experience suggests that technology is a means and not an end itself. Innovation of technological solutions without due regard to institutional factors necessary for the success of technology is to indulge in a target achievement oriented ritualism rather than working on a problem solving strategy. It seems tubewell are being installed without any proper planning or consideration to prevailing local factors. In the high level meetings, emphasis is laid on the speedy implementation of the project without a proper evaluation of the work thus far completed.<sup>37</sup> In a situation like this when government was making such a heavy capital investment (about Rs.400 thousand for 100 hectare), the tubewell command farmers should have been persuaded to go for voluntary consolidation of holdings. As a matter of fact, voluntary consolidation of holdings should have been made a necessary precondition for the installation of a tubewell. In a similar kind of situation, Sone CADA in Bihar

made voluntary consolidation of holdings a necessary precondition for On Farm Development (OFD) works and did succeed in bringing about consolidation of holdings voluntarily by the farmers.<sup>38</sup>

There are certain other options in the form of appropriate technology which are being experimented to provide percolation of ground water benefits to the small farmers. The necessity was felt because of the shortage of electricity for lift irrigation. At present there seems to be no hope to generate sufficient electric power in near future. Even diesel operated pump sets are not feasible on account of shortage of diesel at the peak requirement periods. Moreover, to save valuable foreign exchange, it is not advisable to increase the import of diesel.

One of the suggested technological solutions is bullock-drawn pumps, especially for small farmers. The cost of the bullock-drawn pump, including a shallow tubewell comes to about Rs.3200 and the cost of an ordinary pair of bullocks is around Rs.2000. It is cheaper than the Persian Wheel - a traditional source of irrigation, which costs about Rs.6700. The discharge of bullock drawn pump comes to around 5000 gallons per hour which is very near to a electric or diesel operated pump. Nijjar and Vassart feel that still some more research is needed, especially with respect to the type of speed conversion device used in bullock driven pump.<sup>39</sup>

Ghate has reviewed the performance of wind mills as another technological solution to replace electricity or diesel for generating power to operate pumpsets. He found wind mills potentially competitive with diesel even in a district like Gazipur having low windspeed condition. The cost differential between the two should improve in favour of windmills as they improve their dependability, efficiency and cost performance on the one hand and diesel continues to become more expensive and hard to procure on the other. However, he concludes, windmills do not constitute as yet a viable solution to the problem of small farmer's irrigation.<sup>40</sup>

One technological innovation in the form of bamboo tubewell has been quite successful in the Kosi command area of Bihar.<sup>41</sup> The locally assembled bamboo tubewell, constructed from split bamboos, coconut coir, old cans and pitch by village artisans, sunk by labour intensive fitting method and powered by a mobile diesel or a electric pump is quite popular in that region. Some of the literature on the experiment of bamboo tubewells in the Kosi region has emphasized the potential benefit of this innovation to the small farmers.<sup>42</sup> The same experiment is being successfully repeated in the Gonda district of eastern U.P. The bamboo boring is reported to have reduced the cost of boring a tubewell by two-thirds and it is said to be a cheapest irrigation for a small farmer.<sup>43</sup>

There is an organizational alternative to small farmer's irrigation in the eastern part of Indo-Gangetic region where

holdings are fragmented and very small and the alternative in Group Tubewell. Neither IDS seminar nor any scholar has thought of it as a worthwhile proposition to solve the irrigation problem of small farmers. No doubt, Dhawan in his book on tubewell irrigation does make a mention that "cooperatively-owned tubewells, which are suited for Indian conditions of small and fragmented holdings, have not so far made any noteworthy headway in the country."<sup>44</sup> But he does not take the subject any further. In U.P., cooperative tubewells and Panchayat tubewells were started during the hey day of faith in Panchayati Raj institutions in the late fifties and early sixties when the explicit objective was to strengthen these local participatory institutions and the concern was not so much with the distribution of benefit to small and poor farmers. On the management front cooperative and Panchayat tubewells proved worse than State tubewells to the extent that few of them even survived. A PEO study team (1961), basing observations for the Saharanpur district in U.P. was baffled to find that tubewell in question were diesel and not electricity operated, particularly when there was a distinct performance for the latter. The study found that not a single cooperative tubewell was functioning properly or had maintained any records since 1956-57, and even their office bearers wanted them to be taken over by the government and/or energised with electricity. Ghate in the course of an on-going action research in U.P. during 1980 found that 72 Panchayat tubewells were lying defunct in Gazipur district of U.P. beyond economical

position to repair. One of the commonest cause of failure was non-collection of dues leading to disconnection or to undertake timely maintenance and repairs. He was told that some of the tubewells were cannibalised for parts by the Pradhans of the Gram Sabha (Village Council) themselves.<sup>45</sup> An all India team on minor irrigation found the similar fate of cooperative tubewells in Meerut district of U.P. during 1960. The report of the team mentions that 590 cooperative tubewells were installed in Meerut and Moradabad districts by Cooperative Cane Growers Federation and other cooperative societies. At the time of team's visit only a few were reported to be working satisfactorily. 124 tubewells out of them were to be taken over by the Irrigation Department at a cost of Rs.65 lakhs.<sup>46</sup>

However, if we take into consideration the poverty and land holding pattern of the East Gangetic region the group tubewell appears to be the most logical choice for the small farmers of this part of the country. Here the holding of the small farmers, apart from being very small, are scattered in the absence of consolidation of holdings, therefore, private tubewell is not an economically viable proposition. However, a tubewell becomes an economically viable proposition if it is owned by a group of small farmers having contiguous holdings in this region of abundant ground water. In the districts of Deoria (U.P.) and Vaishali (Bihar), group tubewells installed with the help of voluntary organizations and owned collectively by groups of small and marginal farmers are doing a very satisfying job.

### Notes and References

<sup>1</sup>In this report small farmers mean all those having land holdings upto 2 hectares and thus include marginal farmers (below 1 hectare). Similarly the term small holdings include marginal holdings unless the categories are specifically mentioned.

<sup>2</sup>All India Report on Agricultural Census, 1970-71, Government of India, Ministry of Agriculture and Irrigation, Department of Agriculture, New Delhi.

<sup>3</sup>Small Farmers and Landless in South Asia : World Bank Staff Working Paper No.320, February 1979, p.17.

<sup>4</sup>Raj Krishna : Small Farmer Development, Economic and Political Weekly, Vol.XIV, No.21, May 1979, p.913.

<sup>5</sup>Small Farmers and Landless in South Asia (World Bank), op. cit., p.41.

<sup>6</sup>All India Report on Agricultural Census, 1970-71, op. cit., p.27.

<sup>7</sup>All India Report on Agricultural Census, 1970-71, op. cit., p.41.

<sup>8</sup>According to M.S. Swaminathan the productivity of paddy can be doubled the present yield. Similarly Dr. R. Seetharaman has stressed that by sound water management the productivity of paddy can be doubled or tribled (See, Economic Times, February 9, 1982, p.10).

<sup>9</sup>The guidelines issued by Government of India in June 1974 prescribed a uniform size of land holdings for all the states. According to it, small farmers consisted of those having irrigated land upto 2.5 acres or unirrigated land upto 5 acres and marginal farmers were to have a maximum of 1.25 acres of irrigated or 2.5 acres of unirrigated land.

<sup>10</sup>Sixth Five Year Plan, 1980-85, Government of India, Planning Commission, New Delhi, pp.167-170.

<sup>11</sup>The PEO conducted the field work during June 1974 and January 1975. It covered 21 SFDA's and 13 MFAL's projects operated in 17 states. The information was collected from 296 villages, 2557 beneficiaries and 395 non-beneficiaries.



<sup>12</sup>Report on Evaluation Study of Small Farmers, Marginal Farmers and Agricultural Labourers Projects, 1974-75, Programme Evaluation Organization, Planning Commission, Government of India, February 1979, pp.44-47.

<sup>13</sup>Ibid., p.26.

<sup>14</sup>Ratan Ghosh : "Rural Development Through SFDA" (Review of Intervention For Rural Development : Experiences of the Small Farmers Development Agency, edited by B.M. Desai, Centre of Management in Agriculture, Indian Institute of Management, Ahmedabad, 1979), Economic and Political Weekly, 16, 33, August 15, 1981, p.1347.

<sup>15</sup>Niranjan Pant : "Close Look at SFDA's" (Review of Small Farmers Development Agencies in Badaun, Fatehpur and Rae Bareilly Districts of U.P. by S.M. Pandey and J.S. Sodhi, Sri Ram Centre for Industrial Relations and Human Resources, New Delhi, 1981), Economic and Political Weekly, Vol.XVII, No.6, February, 1982, pp.191-192.

<sup>16</sup>Reproduced in SUNDAY, a Calcutta weekly, 13-19 November 1983, p.73, from HITAVADA, a Nagpur daily.

<sup>17</sup>The Times of India, Lucknow, December 3, 1983.

<sup>18</sup>All India Report on Agricultural Census, 1970-71, op. cit., p.41.

<sup>19</sup>Ground Water Development in India, Ministry of Irrigation, Government of India, September 1981, pp.45-46.

<sup>20</sup>Ibid., p.2.

<sup>21</sup>All India Report on Agricultural Census, 1970-71, op. cit., p.47.

<sup>22</sup>B.D. Dhawan : Development of Tubewell Irrigation in India, Agricole Publishing Academy, New Delhi, 1982, p.34.

<sup>23</sup>Ibid., p.39.

<sup>24</sup>Ground Water Development in India, op. cit., pp.45-46.

<sup>25</sup>B.D. Dhawan, op. cit., pp.43-59.

<sup>26</sup>T.G.K. Charlu and D.K. Dutt : Ground Water Development in India, Technical Series No.1, Rural Electrification Corporation, New Delhi, 1982, pp.155-161.

<sup>27</sup>B.D. Dhawan : Development of Tubewell Irrigation in India, op. cit., p.1.

<sup>28</sup>Who Gets a Lost Rural Resource? The Potential and Challenge of Lift Irrigation for the Rural Poor, IDS, (at the University of Sussex), Study Seminar 88, p.156.

<sup>29</sup>B.D. Dhawan : Development of Tubewell Irrigation in India, op. cit., p.159.

<sup>30</sup>Ibid., p.159.

<sup>31</sup>Report of the Comptroller and Auditor General of India for the year 1980-81 (Civil), Government of Uttar Pradesh, Allahabad : Superintendent, Printing and Stationary, U.P., India, 1982, p.142.

<sup>32</sup>Ibid., p.144.

<sup>33</sup>Ibid., p.146.

<sup>34</sup>Ibid., pp.150-151.

<sup>35</sup>Development Forum : Published by the United Nations University and the Division for Economic and Social Information, Vol.XI, No.7, October 1983, p.1. and talks with Chief Engineer Mr. Goel on 10 January 1984.

<sup>36</sup>The visit to the two tubewell sites was carried out with Robert Chambers (Ford Foundation, New Delhi) and was arranged by Mr. Goyal, Chief Engineer, Public Tubewell (World Bank). The visit was preceded by a discussion with the Chief Engineer on the same date.

<sup>37</sup>Tubewell Project : Broad-based plan for speedy implementation, The Pioneer, Lucknow daily, June 11, 1983.

<sup>38</sup>Niranjan Pant and R.K. Verma : Farmers Organization and Irrigation Management, Ashish Publishing House, New Delhi, 1983, pp.37-55.

<sup>39</sup>G.C. Nijjar and Michel Vassart : Bullock Operated Pump, Appropriate Technology, ITDG, London, (Draft), September 1981.

<sup>40</sup>P.B. Ghate : Irrigation for Very Small Farmers : Appropriate Technology or Appropriate Organization, Review of Agriculture, Economic and Political Weekly, December, 1980, p.A-166.

<sup>41</sup>Edward J. Clay : Technical Innovation and Public Policy : Agricultural Development in the Kosi Region - Bihar, India, I.D.S., University of Sussex, August 1980 (Forthcoming in Agricultural Administration).



<sup>42</sup>(i) P.S. Appu : The Bamboo Tubewell : A Low Cost Device for Exploiting Ground Water, Economic and Political Weekly, Vol.IX, No.26, June 29, 1974. (ii) A.J. Domin : The Bamboo Tubewell : A note on an example of indigenous technology, Economic Development and Cultural Change, Vol.33, No.3, 1975.

<sup>43</sup>(i) B.G. Verghese : A New Farm Culture, Voluntary Action, AVARD's Monthly Journal, November 1981, Vol.24, No.4, pp.203-206. (ii) First you slice your bamboo (From a correspondent in India), The Economist, May 22, 1982, p.57. (iii) Robert Chambers and Deep Joshi (The Ford Foundation, New Delhi) : Notes, Reflections and Proposals on Ground Water Development Following a Visit to Gonda District, Eastern U.P., March 9, 1983.

<sup>44</sup>B.D. Dhawan : Development of Tubewell Irrigation in India, op cit., p.6.

<sup>45</sup>P.B. Ghatge : Irrigation For Very Small Farmers : Appropriate Technology or Appropriate Organization?, op. cit., p. A-170.

<sup>46</sup>All India Review of Minor Irrigation Works based on State-wise Field Studies, Committee on Plan Projects, Planning Commission, Irrigation Team, New Delhi, June 1966, p.48.

## CHAPTER II

### Vaishali

Vaishali was made a separate district in 1973. Earlier, it was a part of Muzaffarpur district in Bihar. In the District Gazetteer of Muzaffarpur (1958), it is clearly mentioned that the district had Zamindari System for revenue settlement. The state government had passed 'Zamindari Abolition Act' and after its enforcement the intermediary link between Raiyat (public) and government had been abolished. However, the economic condition of Zamindars was not affected in true sense as they were not dependent only on Zamindari and their other sources of income were not at all touched by this Act. But the condition of the small farmers of the area remained the same as was before the enforcement of Act which holds true in present times also.

Preponderance of small and marginal farmers is a common feature of the state as well as district, though their share in land holding is very low compared to their number. According to the Agricultural Census (1970-71), in Vaishali 88.31 per cent holdings were of small and marginal farmers which were higher than 78.97 per cent in the state. Against this 46.57 per cent of cultivated area in Vaishali belonged to small and marginal farmers. It is much higher than 29.68 per cent in the state.<sup>1</sup> The average size of marginal holdings in the district was 0.34 hectares which is slightly lower than 0.38 hectares in the state. Similarly the average size

of small and marginal holdings in the district is 0.48 hectares which is again lower than 0.57 hectares in state.

According to the 1971 Census the total population of the district is 13.49 lakhs out of which 49.59 per cent are male and 50.41 per cent are female. The sex ratio comes to 1016 females per thousand male. Only 26.83 per cent population is working. Out of total working population 50.28 per cent are of cultivators and 36.19 per cent are of agricultural labourers. Thus, 86.47 per cent of total working force is dependent on agriculture one way or the other and is higher than 82.26 per cent in the state.<sup>2</sup> It shows that the economy of the district is dependent on agriculture heavily.

Reported area for land utilization in the district was little over 20 lakh hectares during the year 1973-74, out of which 70.10 per cent area was under cultivation compared to 48.32 per cent in case of Bihar state. Net irrigated area is very low compared to net area sown in the district as well as in the state and is 13.30 per cent (Vaishali) and 28.55 per cent (Bihar). Of the net irrigated area in the district 72.69 per cent is irrigated through tubewells compared to only 24.13 per cent in case of Bihar. This clearly shows the high level of utilization of ground water in the district. The area irrigated by canals cover a meagre 0.12 per cent of net irrigated area which is negligible in comparison to 38.70 per cent area irrigated by canal in the state as a whole.<sup>3</sup>

### Evolution of Group Tubewell

The brain behind 'development of small farmers through their own efforts' was late J.C. Mathur of Indian Civil Services (ICS). He started his career as Sub-Divisional Officer, Hazipur and Vaishali was under his domain. Basically, he was a 'reformist' and was very much struck by the rich cultural heritage of Vaishali. It was very backward as far as economic conditions of small farmers, who were numerically dominating the rural population, was concerned. To preserve cultural monuments and remove poverty of the area he formed Vaishali Sangh during early fifties, which is still serving the area and its people. During late sixties he was transferred and posted as Additional Secretary in Ministry of Agriculture and was closely associated with the Indian Committee Under Freedom From Hunger Campaign.<sup>4</sup> This provided him an opportunity to do something concrete for the economic upliftment of the poor farmers of Vaishali. He got a detailed project report prepared for the development of small farmers in the region which was sent to the Agricultural Finance Corporation for their recommendation. The Director and Project Officer took around two years to recommend it in its present form. Mathur contacted K.D. Dewan for the execution of this scheme. Dewan, a graduate in Agriculture, had come to India as a refugee and had settled at Nelokheri in Haryana (now in Punjab). He was a committed social worker and had done some commendable work in organising farmers' cooperatives in that area. Dewan was impressed by Mathur's idea and came to live

in Vaishali in 1969 and with his efforts was born Vaishali Area Small Farmers' Association (VASFA) in 1971. It is a voluntary organization registered under the 'Societies Registration Act 1860'. Its headquarter is located at Vaishali. VASFA was recognized as the first pilot project of its kind in the country by the Committee under Freedom from Hunger Campaign.

#### Functioning of VASFA

VASFA works in collaboration with People's Action for Development India (PADI), Ministry of Rural Reconstruction, Government of India and Central Bank of India. Initially it received a grant of Rs.400 thousands from the Government of Norway. Out of this amount, Rs.200 thousands were kept in the loaning bank (Central Bank of India) as the security against loans and the other half is used as a revolving fund for the developmental works conducted by VASFA, particularly construction of the tubewells. The main sources of VASFA's income are membership fee, interest on margin money, grants, service charges and house rent.<sup>5</sup> The annual income of VASFA is around Rs.32 thousands. Its expenditure items are establishment, contingency, travelling allowance of staff and other over head expenditure including running and maintenance of vehicles. VASFA runs in deficit annually which is compensated from the revolving fund. It has its own office building, workshop and godown. The construction cost of these was provided by PADI and land was purchased from VASFA's savings. It owns 2 motor cycles, 4 pumpsets, 2 spray machines, one jeep and one power trallor.



VASFA has its executive committee consisting of a President and 3 Vice-Presidents (representing three zones of VASFA) elected by all the members for the duration of one and three years respectively, a Treasurer who is representative of PADI and a General Secretary who is nominated jointly by PADI and Vaishali Sangh for 6 years. Apart from the Executive Committee, there is a Project Coordination Committee of government officials constituted to help the small and marginal farmers in their developmental plans. The President of the committee is the Commissioner of Tirhut Division and its Vice-President is the President of VASFA. The General Secretary of VASFA acts as the Secretary of this committee also. The members of this committee are Deputy Commissioners of Vaishali and Muzaffarpur districts, other government high officials and three progressive farmers of the area. These farmers may or may not be the member of VASFA.

Following are the main aims and objectives of VASFA :

1. To provide agricultural training and developed technical knowledge of modern agriculture to farmers, particularly the small ones.
2. To organise different kinds of activities for the betterment of economic and social condition of small farmers.
3. To attract the farmers towards allied industries based on agricultural outputs.
4. To manage loan for the group tubewell, agricultural machines, godowns and apparatus of plant protection.



5. To act as a link between PADI, Vaishali Sangh, Agricultural Finance Corporation and other organizations and institutions which are working for the development of agriculture.
6. To organise special regional working farmers' groups.
7. To get funds from persons, associations, trusts, national and international institutions for the development of VASFA.

To achieve the above mentioned aims and objectives three major steps have been decided to adopt. Firstly, it has been decided to select farmers having small and contiguous holdings within an area of 20 to 40 acres of land who are ready for the collective use and joint ownership of the tubewell and are ready to follow the norms of VASFA. Such groups of farmers are called 'Krishak Dal'. The cost of group tubewell is divided among the members as per the area of their land in the command. Power thrasher, sprayer etc. are also provided to the group, if desired. Apart from this, inputs and other required materials are also provided to group members along with the marketing facilities for their products. Secondly, those farmers who cannot meet their household requirements even after a good crop on account of the small size of their holdings are to be provided extra assistance. The assistance is to be provided in the form of animal husbandry, fisheries, poultry, transport, household industry, etc. Thirdly, after the completion of above two steps, it is presumed that the farmer is self-sufficient to support his family and efforts are to be made to provide him other facilities like education, housing, etc.

### Installation of Group Tubewell

Villages having preponderance of small and marginal farmers are selected by the General Secretary of VASFA with the help of block officials for the installation of group tubewells. Groups of small and marginal farmers is formed in the selected villages after persuading them to gain benefit of group tubewells. The group size varies from 15 to 45 farmers. Initially it was decided that size of the group should not exceed 20 members. But it was not possible to be rigid on the size on account of various local factors. One thing, however, is essential that the holdings of group members should be contiguous so that they can be commanded by a group tubewell. Generally farmers having land over 5 acres are not included, however, sometimes their inclusion is unavoidable on account of the location of their land. Group members are also made aware of the responsibilities of entering into an agreement and signing various documents for obtaining term loan from the Bank for the installation of group tubewell, crop loans etc. as well as regarding their joint responsibility for the proper running of the tubewells. Members pay Rs.5 each as admission fee and Rs.3 yearly as membership charges to VASFA. One of the members in each group donates 0.02 acres of land to VASFA for the installation of tubewell at a suitable site. Each member submits copies of their land record and signs an agreement to follow the rules of VASFA. The members of a group tubewell elect a group leader. After

going through these formalities papers are submitted to the Bank. The required amount is withdrawn from the revolving fund of VASFA for the construction of tubewell cabin, installation of pumpset, energisation, and construction of field channels. The total cost is distributed among all the group members in proportion to the area of their holdings under the tubewell command. At this stage the members enter into a direct agreement with the Bank according to which the borrowed amount is treated as term loan against individual farmers.

According to the constitution of VASFA, the repayment of term loan is to commence after three years of its sanction. Each farmer is required to pay his loan with interest in five years in six monthly instalments. Earlier it was planned that each member farmer was required to earmark 10 per cent of their area under tubewell command towards repayment of the term loan. The crops grown in this portion was to be harvested under the supervision of VASFA staff. It was also planned to sell the produce after thrashing and winnowing in the market at a profitable rate and remit it to the bank against the loan. Though this procedure of repayment is good and provides assurance of repayment but it could not come into practice due to lack of staff in VASFA. Repayment is entirely left to the members.

#### Management of the Group Tubewell

Group leader takes care of the management aspect of group tubewell with the help of his group members and VASFA

officials. The management of tubewell includes water distribution among members and non-members, operation, timely maintenance and repair of tubewell and field channels, maintenance of irrigation records, income-expenditure account etc. As far as water distribution is concerned, in most of the cases time is allotted to the members as per the proportion of their land in tubewell command. Some times it is distributed by a mutual agreement.

In all the cases the basic principle regarding water distribution is that first priority is given to the members land under command then to their land outside of command. After fulfilling the water requirement of members, it is provided to non-members. The operators of the tubewells who are generally the group leaders or their family members maintain the irrigation records. Generally there is no proper record book and the operators maintain it on a piece of paper due to which they face lots of problems in the maintenance and preservation of records properly. The group leader is responsible for the maintenance of tubewell. Expenses incurred on maintenance and repair are shared by the members as per their share in the tubewell command. For the maintenance of field channels, two systems are followed. In the first system the members clean and maintain the field channels upto their plot only. In the second system, member farmers maintain the channels collectively. Generally member farmers do not get involved in conflicts but sometimes conflicts do occur and are resolved. The prevalent and the most effective mode of conflict resolution is group meeting.

Sometimes VASFA officials also attend these meetings. Cases were found where members who are difficult to tackle are threatened that their membership would be terminated, but so far, it never came into practice. Water charges are fixed by the group leader with the consent of his group members. Water charges of electrically and diesel operated tubewells are different. As far as non-members are concerned, their charges are much higher and vary from Rs.8 to Rs.10 per hour. Group leader collects water charges and deposits electricity bills or purchases diesel. Income and expenditure account is maintained by group leader which he is liable to produce before members in group meetings. If tubewell runs in profit then members get their share and if it runs in deficit members contribute as per their share. Members pay the irrigation charges at the time of sale of their crop and mostly non-members pay just after taking the water. This system is not very rigid and sometimes non-members pay on a monthly basis also.

#### Achievements of VASFA

During the last 12 years (upto June 1983) of its working VASFA has organized 36 groups, each with a group tubewell in 16 villages of Vaishali and Muzaffarpur districts covering a membership of 650 farmer families. The association is divided into three zones, namely, Vaishali, Madarna and Bibipur covering 16, 7 and 13 group tubewells respectively.



As a result of successful implementation of group tubewell programme by VASFA, Denmark government has provided funds to PADI, New Delhi for establishing projects on VASFA lines. Each project got a grant of Rs.6 lakh as margin money, revolving fund, building fund, customers free service, vehicles, etc. Regional office of Central Bank of India, Patna, has opened a separate PADI cell at Vaishali and Bagha (West Champaran) to control and facilitate the advancement of loan to Denmark International Development Agency (DANIDA) projects in Bihar. Apart from this, Central Bank of India has granted Rs.1.5 lakhs for the welfare of small and marginal farmers of the association. Christian Relief Society, Patna, has provided grants as per the requirement of VASFA under 'Food for Work Programme'. These grants are used for the improvement of village roads, fishery tanks, schools, Panchayat Bhawans and labour charges for the reconstruction of the cabin of the group tubewells. Keeping in view the acute electricity problem, animal operated tubewells are also under experiment in VASFA.

#### Problems and Bottlenecks

In spite of successful implementation of group tubewell experiment, there are certain problems and hinderances in the smooth functioning group tubewell. In the initial stage when the groups were being formed, some influential big farmers also came into groups. They managed to get tubewells installed in their land and also became group leaders. These persons



are creating problems by committing all kinds of irregularities and trying to deprive the other group members from getting water and in obtaining other facilities provided by VASFA. In some other cases, caste barriers are proving to be a handicap as the high caste and low caste people are not coming together for working collectively for the common good. Keeping in view these problems, it is advisable that before forming a group it is necessary to check authentically the total landholding of a farmer and to the extent possible larger farmers should not be allowed to become group members.

There are cases where the said command of the tubewell could not be confirmed from the revenue records. Sometimes the members find that their actual land in the command is less than mentioned in the Bank records which are based on revenue records. As a result, they are not ready to accept the apportioning of the cost of the group tubewell on them. This problem has created hindrance in the repayment of the dues. On the other hand, there are some member farmers who want to include some more contiguous land in the tubewell command. Hence, refixing of command and reapportioning of the cost among members with the necessary changes in their Bank records is required.

Recovery of the bank loan is a very common problem in most of the cases. It was not stressed in the initial stage to give farmers ample time to maximise their agricultural production and to repay the loan when they become prosperous. However, this initial complacency has made the farmer indulgent,

non-appreciative of the role of the bank and he does not attach any importance to the repayment. He is having a mentality to treat the loan as a free gift and does not care to repay it. As a result, the bank loans have become sticky for years together, interest over interest mounting the outstanding dues.

Another problem is that the authorities generally start work on a new tubewell without completing one tubewell. They do so without completing necessary accessory jobs in the previous tubewell like, energisation, construction of field channels, etc. As a result, the farmers cannot avail irrigation facility for a long period. In some cases, this gap reaches upto two years. Such a practice disheartens the members. Moreover, interest also goes on mounting on the capital cost. This delay is unwarranted and should be avoided.

In the initial stage it was planned that beneficiaries would grow cash crops also and their cropping pattern would be channelized in a prescribed way using developed agricultural techniques and implements. It was a good plan for the economic upliftment of the members but it could not come into practice due to lack of field staff to provide extension service, close supervision and guidance.

The problem of maintenance and repair of the tubewell is also acute as VASFA has only one mechanic. More mechanics cannot be appointed due to lack of funds. It is necessary to have a close supervision and check over the mechanic to increase his efficiency.

There is no proper log book provided to group leaders for the maintenance of irrigation records and accounts. It is necessary that VASFA staff should check these records periodically to ensure systematic and accurate maintenance of records and accounts.

Incidence of theft of motor of pump also occurs sometimes and creates serious problems for the farmers. A case of theft is illustrated here. The motor of the group tubewell No.15 in Vaishali village was stolen during 1979. A FIR (First Information Report) was lodged with the police and the information of the theft was communicated in writing to the loaning Bank and VASFA. Till June 1983 when one of the authors visited the village nothing had been done in this respect. This tubewell is having a group of 42 members, all of them are small and marginal farmers and they cannot purchase a new motor due to their poor economic conditions. Since the date of theft, they could not take water from their group tubewell. Loaning Bank wants the repayment of debt and members do not have money to repay it. They had requested the Bank to sanction a new loan to allow them to purchase another motor but the Bank authorities had refused. The members of this group also requested VASFA officials for a motor which was with the VASFA and they were ready to pay the cost of the motor in instalments. However, the VASFA officials did not accept this request since the motor was used as a time gap replacement for under repair motors during peak requirement period. No doubt,

the problems of this nature do remain but the programme is catching the attention of various donor agencies and is picking up fast in other areas in the region.

### Notes and References

<sup>1</sup>For district figures see - Report on Agricultural Census, 1970-71, Bihar, p.248. For state figures see - All India Report on Agricultural Census, 1970-71, Government of India, Ministry of Agriculture and Irrigation (Department of Agriculture), New Delhi, p.136.

<sup>2</sup>Bihar Through Figures, 1977, Statistics and Evaluation Directorate, Patna, Bihar.

<sup>3</sup>Indian Agricultural Statistics, Vol.II, District-wise, 1970-71 to 1973-74, Directorate of Economics and Statistics, Ministry of Agriculture, Government of India.

<sup>4</sup>The Indian Committee under Freedom From Hunger Campaign was later converted into People's Action for Development, India (PADI). It is a registered society funded by the donations from the foreign countries and works under the Ministry of Rural Reconstruction, Government of India, whose Secretary is its ex-officio Chairman.

<sup>5</sup>VASFA has rented out two rooms, one to PADI, Vaishali and another to Central Bank of India, Vaishali branch and receives an amount of Rs.250 and Rs.300 per month respectively as rent.

### CHAPTER III

#### Deoria

Deoria is one of the 56 districts of Uttar Pradesh. Before 1946 it was a Tehsil of Gorakhpur district. Need to make it a separate district was felt even in the year 1909 due to its developing economic activities.<sup>1</sup> The district lies between the parallels of latitude 26° - 28° north and longitude 83° - 85°. It falls under Gorakhpur division and geographically lies at its north-east portion. It is bounded on the east by the Saran district of Bihar on the west by the Gorakhpur district, on the north by the Champaran district of Bihar and on the south by the Azamgarh and Ballia districts.<sup>2</sup>

The district is divided into 4 tehsils and these tehsils are in turn divided into 29 Community Development Blocks. Civil administration of the district functions under the District Magistrate. Sub-Divisional Magistrates and Tehsildars assist him in this task. As far as developmental work in the district is concerned, it falls under the domain of District Development Officer who is assisted by Block Development Officers who in turn are assisted by Assistant Block Development Officers. The blocks are sub-divided into 400 Village Level Worker circles.

Deoria lacks in infrastructural facilities due to which it is one of the backward districts of Uttar Pradesh. The district can be approached by train from the state capital. It has a net work of 253 kms. of railway lines spread over the



district having 30 railway stations. The total length of the road which falls under the domain of Public Works Department is 1191 kms. and under different local bodies is 386 kms.<sup>3</sup> It comes to about 221 kms. of road per thousand square kms. of the area and 42 kms. of road per 100 thousands population. Out of the total revenue villages in the district (3807), there are only 673 villages through which metalled roads pass. It gives an indication of the poor communication position of the district.

Only 34.98 per cent villages to the total inhabited villages in the district are electrified compared to 44.92 per cent in East U.P. and 45.53 per cent electrified villages in the state. During 1979-80 out of the total consumption of electricity in the district, 43.62 per cent was consumed in agriculture which was much more higher than 23.16 per cent in Eastern region of U.P. and 28.04 per cent in the state. Per capita consumption of electricity in Deoria was 0.03 thousand KWH compared to 0.09 thousand KWH in East U.P. as well as in the state.<sup>4</sup>

A negligible number of villages, i.e. 0.03 per cent of the total villages in the district are covered by piped water supply as against 7.97 per cent in East U.P. and 11.61 per cent in the state.<sup>5</sup>

There were 1670 Basic schools, 186 Middle schools, 133 Intermediate colleges and 9 Degree colleges in the district during 1976-77. Out of total population of the district 23.20



per cent is literate which is lower than 27.16 per cent literates in the state during the year 1981.<sup>6</sup>

Number of Allopathic Hospitals/Dispensaries per 100 thousand of population was 1.58 during 1980-81 which is lower than 2.24 in East U.P. and 2.87 in the state. Similarly, the number of beds in hospitals/dispensaries per 100 thousand of population in the district was 15.46 which is very much lower than 40.15 in East U.P. and 49.71 in the state<sup>7</sup> which shows the poor condition of health facilities in the district.

According to the 1981 census, the total population of the district is 3487350 out of which 50.25 per cent are male and 49.75 per cent are female. Out of total population only 28.63 per cent are of workers. Out of total working population, 63.42 per cent are cultivators and 20.52 per cent are agricultural labours.<sup>8</sup> Thus, 83.94 per cent of the total working force is dependent upon agriculture one way or the other. It is higher than 79.08 per cent for East U.P. and 74.55 per cent for the state. It reveals that the economy of the district veers around agriculture.

The district is having abundance of small and marginal holdings. As per Agricultural Census 1976-77, 91.09 per cent holdings were small and marginal which is higher than 90.82 per cent in East U.P. and 85.77 per cent in the state. In comparison to the number of holdings, the area under small and marginal holdings is much less. In Deoria 57.06 per cent area is under small and marginal holdings compared to 54.62

per cent in East U.P. and 45.56 per cent in the state. The average size of the marginal land holding in the district is 0.33 hectare as against 0.36 hectare in the state. Average size of holding in the district (0.76 hectare) is lower than 0.82 hectare in East U.P. and 1.18 hectare in the state. Per cultivator net area sown is also lowest in the district (0.70 hectare) as compared to 0.81 hectare in East U.P. and 0.92 hectare in the state.<sup>9</sup>

According to 1981 census, out of the total reported area for land utilization (537717 hectares), 82.62 per cent area is under cultivation. 56.17 per cent of the gross cropped area is sown in kharif, 42.38 per cent in rabi, only 0.68 per cent is under summer cultivation and 0.77 per cent area is prepared for sugarcane.

The main source of irrigation in the district is tube-well serving 47.18 per cent of irrigated area followed by canal serving 41.15 per cent area and 11.67 per cent area is irrigated by other sources. 48.21 per cent of the gross cropped area is irrigated in the district which is higher than 40.36 per cent in East U.P. and 46.33 per cent in the state. There were 6859 energised tubewells/pumpsets in the district during the year 1982-83.<sup>10</sup>

Percentage of area under commercial crops to gross cropped area in the district was 12.21 which is higher than East U.P. (6.27) and the state (9.98). Per tractor gross cropped area in the district worked out to be 286.77 hectares. It is lower

than 618.34 hectares in East U.P. and 388.19 hectares in the state. Per hectare consumption of fertilizer during 1981-82 was 72.49 kg. in the district as compared to 53.33 kg. in East U.P. and 51.66 kg. in state. Per capita (rural) gross value of agricultural produce during 1978-79 was Rs.474.41 in the district which is more or less equal to the value of Rs.474.21 in East U.P. but lower to Rs.589.51 in the state.<sup>11</sup>

#### Evolution of Group Tubewell

After the successful implementation of group tubewell experiment in Vaishali for the economic upliftment of small and marginal farmers, PADI officials thought of replicating the programme elsewhere. Deoria was thought to be a natural choice for launching the programme because the district was marked by the same kind of characteristics which favoured the choice of Vaishali. Deoria like Vaishali was marked by preponderance of small and marginal farmers, very small and fragmented land holdings and extreme poverty. It has like Vaishali abundance of available ground water. According to the geo-hydrological map of India, Deoria, like Vaishali, falls in the high yield region of unconsolidated alluvium. These formations are richest in ground water and are very congenial to tubewell technology which can exploit water held in sandy aquifers only, and not in water bearing strata found in rock formations, i.e., consolidated formations. According to one source, the balance of underground water to total safe yield in Deoria as on April 1, 1980 was 82.5 per cent compared to 65.69 per cent for U.P.<sup>12</sup>

The GTW programme was started in Deoria district in 1974 under "Indo-Norwegian Agricultural Development Project" (INADP) sponsored by PADI, through Ministry of Rural Reconstruction, Government of India. The area of INADP covers three blocks of Deoria district, namely, Deoria Sadar, Rudrapur and Gauri Bazar. It is proposed to start the work in Gauri Bazar in the last stage. In the first phase the work is being done in Deoria block which contains 29 villages with 1000 families and 2000 acres of land. So far the work has been done only in 19 villages. The project aims at organizing 70 groups of farmer families in the block. The execution of the project at district-level is vested in the Project Implementation Committee (PIC),<sup>13</sup> a registered society under 'Societies Registration Act of 1860'.

The PIC consists of District Development Officer (Chairman), District Agriculture Officer (Member-Secretary), all the other departmental heads (members) and INADP in-charge as PADI representative. Block Development Officers of Rudrapur, Gauri Bazar and Deoria blocks are also members of PIC.<sup>14</sup> The execution of the plans formulated by PIC is the responsibility of INADP in-charge.

INADP has its own building at Mundera Buzurg village located at a distance of 10 kms. from Deoria. Three rig machines and other tools for the installation of group tubewells are provided by PADI and Action for Food Programme (AFPRO), New Delhi. Apart from these, the project possesses one tractor with trailer

and cultivator, one motor cycle, one power thrasher, and one diesel pumpset to provide custom services to farmers. The tractor provides the facilities of ploughing, thrashing and transportation on reasonable rates to small and marginal farmers. The project provides pumpset for irrigation upto the completion of energisation of a group tubewell.

The PIC works in collaboration with INADP and Central Bank of India, Deoria. A sum of Rs.5 lakhs was made available by Norway government through PADI for the total period of the project. So far, Rs.260,000 have been provided by PADI, New Delhi, which is being used as revolving fund and customer services. In addition to this, PADI, New Delhi, had given Rs.180,000 in 1979 which was deposited under Time Deposit Scheme of Central Bank of India, Deoria. On behalf of this amount the bank has agreed to give money ten times of this amount as loan to the beneficiaries of the project and the interest earned on this deposit is used to meet the establishment cost of the project.

### Objectives

Similar to VASFA, the main objective of the project is to develop small, marginal and resourceless poor farmers in all aspects. Apart from this basic objective, the project also aims : (i) to provide technical facilities and to help in collection of materials required for the installation of tubewell; (ii) to help farmers to get bank loans so that they can get rid of local Mahagani loan; (iii) to provide dairy development-cum-extension facilities for generating additional



income; (iv) to develop the status of women through womens' programme and; (v) to facilitate farmers in getting crop loan for seed, fertilizer and pesticide from the Central Bank of India.

#### Installation of Group Tubewells

The groups of small and marginal farmers are formed after a survey conducted by the INADP staff concerning the felt needs of the farmers. The tubewell groups generally comprise of 5 to 15 farmer families. The group members automatically become members of INADP. The project provides them with electric or diesel tubewells as per their request. During the initial stage of project the officials of INADP were motivating the small and marginal farmers to obtain the benefits of group tubewell. But presently, farmers themselves approach INADP officials as they have become aware of its benefits. An engineer from the drilling division of INADP visits the site (fields of group members) and selects the place where drilling is possible according to the suitable water strata. Owner farmer of the selected place has to transfer ownership of 0.02 acres of land to the PIC (INADP). Before forming the group one thing is kept in mind that the land of small and marginal farmers<sup>15</sup> should be contiguous and can be commanded by a single tubewell. Members pay Rs.5 as admission fee and Rs.3 yearly as membership charges to INADP, Deoria. Each member has to submit land records and has to sign an agreement to follow norms of the project. These papers are submitted to the Central Bank of India, Deoria, and required amount is withdrawn from the



revolving fund of INADP. After the installation of group tubewell and construction of the tubewell cabin and field channels, the total expenses are divided among members as per share of their land under the tubewell command. At this stage these members enter into a direct agreement with the Central Bank of India. According to the agreement the amount is treated as term loan against individual farmers.

#### Repayment of Loan

Even after successful functioning of group tubewells in Deoria, the situation regarding repayment of loan is very poor. Most of the members are defaulters. Negligence on the part of members as well as INADP and Bank officials is responsible for this kind of unhealthy situation. In the initial stage it was planned that each member will give the yield of 10 decimal land to INADP. This yield was supposed to be sold by INADP at an appropriate time and the amount was to be deposited in the bank against the loan of the concerned members. This plan could not be implemented as practically it was not feasible with the limited field staff of INADP. The repayment of loan is, therefore, left entirely to the discretion of member farmers.

#### Management of Group Tubewells

There is one group leader in each group chosen by its members. The group leader manages the functioning of tubewell with the help of group members and INADP staff. The management of a tubewell covers water distribution, operation, maintenance

and repair of tubewell and field channels, maintenance of irrigation record and income-expenditure account and other aspects related to group tubewell irrigation. For water distribution, time is allotted to each group member as per share of their land in the tubewell command. All the fields of the members under the tubewell command get water first. The second priority is given to the members' land located outside the command. After this, water is given to the non-members. Irrigation records are maintained by the operator of the tubewell who is generally the group leader or one of his family members. In Deoria also, like Vaishali, there is no proper record book provided to operator due to which irrigation records are not properly maintained. The group leader is also responsible for the maintenance and repair of the tubewell. Expenses so incurred are divided among members as per their share of land in the command. Field channels are maintained collectively. In most of the cases, conflicts do not arise but whenever it occurs it is resolved by group meetings. However, if the matter becomes out of control of the group, INADP officials are also involved in the group meeting. The charges of water are fixed by the group leader with the consent of his group members. Due to this reason, water charges vary from one group tubewell to another. Collection of water charges is the responsibility of group leader who also deposits the electricity bills.

### Achievements

During the last nine years, upto June 1983, the programme has covered 19 villages of Deoria block organizing 36 groups consisting of about 450 beneficiary farmer families and benefiting about 600 acres of land. Out of 36 tubewells 2 are dieselized while the rest are electrified. Apart from this, 56 cross breed cows have been provided to farmers along with veterinary services and marketing facilities for the sale of milk. One women centre is also operating in Mundera Buzurg village to provide education as well as to train them in tailoring.

### Problems and Bottlenecks

The group tubewells in Deoria are functioning well and are running in profit. Nevertheless, there are some problems and obstacles which may jeopardize their future development. The attitude of the beneficiary farmers not to pay the dues to the Bank is a very serious problem. It is not conducive for the further development of group tubewell. The main reason behind the non-paying attitude of the farmers is said to be the expectation of subsidy on loan from the government. Under the Integrated Rural Development (IRD) programme there is a provision of 50 per cent subsidy from the government on the capital cost of group irrigation works, subject to following conditions : (i) the work should be owned and maintained by a cooperative society, a panchayat or a corporation for the benefit of small and marginal farmers; (ii) more than 50 per cent beneficiaries of such group irrigation works should be small and marginal

farmers; and (iii) in fixing the water charges a concessional rate should be fixed for the small and marginal farmers for a period of 5 years to ensure that the benefit of subsidy on the capital cost are passed on them.<sup>16</sup>

The issue of subsidy was taken up with the Project Implementation Committee (PIC) by the then INADP in-charge during 1980-82. He made all out efforts to prove that the group tubewells were entitled to subsidy because beneficiaries of other IRD programmes and Gandak Irrigation Project were getting subsidy. The District Development Officer, Deoria had put three additional conditions apart from those already mentioned : (i) a group tubewell of 5 horse power must include at least 10 farmers and command at least an area of 10 acres; (ii) group should be comprising of only small and marginal farmers; and (iii) the small and marginal farmer users should be given a concession of 25 and 33 per cent in water charges respectively. He further pointed out that the cost of installation would not be what was spent by INDAP but would be Rs.5000 for a 5 horse power motor having 4" x 3" or 4" x 4" delivery, Rs.6000 for 7.5 horse power motor and Rs.8000 for diesel operated tubewell with boring. As regard the first condition the answer of INADP in-charge was that, although in some cases the group members were less than 10 but since the tubewells irrigated the lands of non-members also, the condition was met by all the tubewells in reality. With regard to the second condition he pointed out that in some cases it was not possible to exclude bigger farmers when their



land came in between the land of small and marginal farmers within the tubewell command. The third condition, he argued, was already being met as the rate at which the members were getting water was about one-fifth of the prevailing market rate. The rate of subsidy was also not acceptable to the project-in-charge. In a meeting of PIC in January 1982, he argued his case forcefully and the District Magistrate agreed to give the subsidy at the rate of 50 per cent. The subsidy was to be given to the tubewells which were installed after the IRD programme came in to being. The District Development Officer later decided to give the subsidy on the amount fixed by the government and not on the expenditure actually incurred by INADP. As a result, a subsidy of Rs.77058 was given for 13 tubewells upto March 31, 1982. Since some of the farmers have actually been benefited by subsidy, the others, particularly, those whose tubewells were installed before 1980 are disinclined to repay the loan hoping that they might also get the subsidy.

The project in-charge had proposed that the group members should grow sugarcane as a cash crop and they should be given preference in supply of sugarcane to the sugar factories to facilitate the recovery of short and medium term loans given to them. The in-charge made several correspondence in this respect with the Cane Commissioner, Gorakhpur, and PADI authorities, New Delhi and even made personal approaches. He regularly drew the attention of the government authorities to give preference to the group tubewell members in this

respect so that they could benefit and could be persuaded and convinced about the advisability of going in for a cropping programme advocated by INADP. However, nothing was done in the matter till June 1983 in favour of group tubewell members.

The process involved in the installation of group tubewell is such that the responsibility of INADP ends when the boring work is completed, motor is installed tubewell cabin and field channels are constructed. After completion of these things by INADP responsibility of energisation is of electricity department which takes too much time. In some cases this period exceeds 2 years. Members have to pay the interest on loan even for this period without availing the facility of group tubewell.

The maintenance and repair of group tubewells is also an acute problem. There is only one mechanic appointed by PADI under INADP for the maintenance and repair of all the group tubewells in Deoria. There were cases when a tubewell remained defunct even during the peak requirement periods. It is highly desirable to increase the number of mechanics at least by one.



Notes and References

- <sup>1</sup>Gorakhpur : A Gazetteer being volume XXXI of the District Gazetteers of the United Provinces of Agra and Oudh, 1909.
- <sup>2</sup>Primary Census Abstract, Deoria, Part X-B, 1971, p.vi.
- <sup>3</sup>Statistical Bulletin, 1979, Deoria, State Planning Institute, U.P., p.19.
- <sup>4</sup>District-wise Indicators of Development, Area Planning Division, State Planning Institute, U.P., August 1983, p.13.
- <sup>5</sup>Ibid., p.17.
- <sup>6</sup>Ibid., p.5.
- <sup>7</sup>Ibid., p.17.
- <sup>8</sup>Census of India, 1981, Series - 22, Uttar Pradesh, Provisional Population Tables.
- <sup>9</sup>District-wise Indicators of Development, op. cit., p.7.
- <sup>10</sup>Ibid., p.13.
- <sup>11</sup>Ibid., pp.9-11.
- <sup>12</sup>District-wise Indicators of Development, 1983, op. cit., p.9.
- <sup>13</sup>The Governing Body of the PADI was of the view to have Vaishali like pattern for Deoria in the form of Deoria Area Small Farmers' Association (DASFA) and to transfer the powers of PIC to DASFA. Therefore, sometime in 1980 a registered society was created for this purpose and the Agriculture Development Commissioner, U.P. was requested to transfer the powers of PIC to DASFA. However, it was not been accorded approval by the State Government till June 1983.
- <sup>14</sup>At present the project is functioning in Deoria block only but later, it is planned to cover Rudrapur and Gauri Bazar blocks also.

15 There are many cases in Vaishali where big farmers also became group member and were creating various problems. The reason may be the experiment was first tried in Vaishali and by the time it was started in Deoria the INADP staff, most of whom came from Vaishali, had learnt the lesson well from the past experience. As a result, they excluded big farmers from the membership as far as possible.

16 R.C. Arora : Integrated Rural Development, S. Chand & Co. Ltd., New Delhi, 1979, pp.430-431 (Appendix).

17 Vaishali GTWs are lagging far behind Deoria in the matter of subsidy. Here only one of the GTWs studied by us and installed in 1982 has so far received the subsidy. The two main reasons of this lag are : First most of the GTWs in Vaishali were installed before 1980, the year from which subsidy under IRD was started to be given for group irrigation works. Second, the implementation of the provisions of the IRD in Bihar is rather slow mainly because unlike INADP, VASFA does not have district level officers in its executive committee.

## CHAPTER IV

### The Survey

The survey is an outcome of several visits to Deoria district made by the senior author in the years 1981 and 1982. During these visits it was found that Group Tubewells (GTWs) initiated and run under the overall supervision of INADP were functioning well and serving the small and marginal farmers of the area. The successful experiment of GTWs provided us with an opportunity for a research in the field of group irrigation works aimed at benefiting small and marginal farmers. Therefore, to get a better idea of the working of the GTWs, a survey was conducted in the month of June 1983 in the districts of Deoria in U.P. and Vaishali in Bihar. Before we undertook the survey, we found that 36 GTWs were running under INADP in Deoria and the same number of GTWs were running under Vaishali Area Small Farmers' Association (VASFA). In case of Vaishali, GTWs were being also run by other voluntary agencies like, Denmark International Development Agency (DENIDA). However, our survey was confined to the group tubewells installed by VASFA only since the concept of group tubewells for small and marginal farmers was first experimented by this association.

The survey was conducted keeping in view the following objectives : (i) to find out the technical aspects involved in the installation of low cost medium tubewells; (ii) to find out group size feasible for tubewells; (iii) to find out the size of command prevalent in group tubewells; (iv) to find out who are the real beneficiaries of group tubewells and

to which socio-economic groupings they represented; (v) to find out feasibility of group tubewells in terms of income and expenditure; and (vi) to find out problems and bottlenecks in the smooth functioning of group tubewells.

The salient features of the group tubewell under study and other related information is described in the following.

Information regarding year-wise installation in both the districts for all the 72 group tubewells were collected. Hence, the analysis presented here is for all the 72 tubewells. The development of group tubewells in the two districts is not uniform (Table 1). In case of Vaishali the first tubewell was installed in 1971 after the VASFA was formed, while the same was done in 1974 in case of Deoria. In case of Vaishali there is a speedy development of GTWs in the early years and in the first two years of launching of the experiment (1971 and 1972) 26 tubewells were installed. Even during the third year (1973) five tubewells were installed. After that there is a lull of 7 years during 1974-81 (with the exception of 1975, the emergency period, when 3 tubewells were installed) when no tubewell was installed. In the years 1982 and 1983, one tubewell in the each year was installed. In case of Deoria the maximum number of tubewells (11) were installed in the year 1981. The development of GTW in Deoria during 1975-83 was more or less uniform with the exception of two years - 1977 and 1979, when only one tubewell in each year was installed and in 1978 when none was installed. With the passage of time we notice a downward trend of the development

of group irrigation works in Vaishali, whereas in Deoria it shows a balanced pattern of development.

In Table 2, we have examined the group tubewells of both the districts in terms of their size and depth and find that out of 50 tubewells the maximum number (29) are of 4" x 4" size followed by 5" x 4" (6) and 5" x 3" (5). In terms of depth, all these are medium tubewells. However, the maximum number (28) are having the depth in the range of 100.01 to 150 feet followed by 11 having the depth of 50.01 to 100 feet and 9 upto 50 feet deep. There are only two tubewells, both in Vaishali, having a depth of more than 150 feet. As regard the horse power and water discharge (Table 3), the maximum number of tubewells (21) are of 5 horse power, closely followed by 20 tubewells of 7.5 horse power. There are 3 tubewells of 10 horse power in Vaishali and none in Deoria. In terms of discharge, the maximum number of tubewells (24) are having discharge capacity of 7501 to 10000 gallons of water per hour, closely followed by 19 tubewells in the range 5001 to 7500. There is only one tubewell of 3 horse power in Deoria having less than 5000 gallons of water per hour. The average horse power, discharges, size and depth are presented in Table 4. The average depth of the tubewells is higher in Vaishali compared to Deoria. In Vaishali, the average depth of tubewells works out to be 112 feet whereas in case of Deoria it is 92 feet. Similarly the average horse power of tubewells in Vaishali works out to be 6.9 which is higher compared to 5.8 in Deoria. However, the average discharge is more or less the same in the two districts. In case of Vaishali it works out to be 8320



gallons per hour which is slightly lower to 8540 gallons in Deoria. Contrary to these averages, the model values of the size, depth and discharge of tubewells in two districts works out to be same. However, the model value of the horse power is different in the two districts (Table 5). The model size of tubewells in both the districts is 4" x 4" the depth in the range of 100 feet to 150 feet and the discharge in the range of 7501 to 10000 gallons per hour. The model value of horse power, on the other hand, in Deoria is 5 against 7.5 in Vaishali.

In terms of cost (Table 6), the maximum number of tubewells (17) are in the cost range of Rs.10000 to Rs.15000, followed by 13 in the range of Rs.15001 to Rs.20000 and 12 below Rs.10000. An interesting point is that while most of the tubewells in Deoria (22) are in the middle cost range of Rs.10000 to Rs.20000, in case of Vaishali the largest numbers are in two extremes with 10 tubewells in the range below Rs.10000 and 7 above Rs.20000. The average cost for a Deoria tubewell is about Rs.14200, while it is about Rs.15500 for Vaishali.

The differences in two districts are also noticeable when we compare the size of the tubewell groups (Table 7). In Deoria 52 per cent of the tubewells are those having 5 to 9 members, followed by 32 per cent in the range of 10 to 15 members. On the contrary, in Vaishali 40 per cent of the GTWs have 16 to 25 members while only 24 per cent GTWs have 5 to 9 members. In all, there are 410 members in Vaishali and 206 in Deoria. The average number per GTW being 8 for Deoria and about 16 for Vaishali. Similarly, differences are noticeable when we compare



the commands of the GTWs in the two districts (Table 8). In Deoria, 60 per cent of the GTWs have a command of less than 10 acres, while in Vaishali only 32 per cent GTWs fall in this category. On the other hand, 24 per cent GTWs in Deoria have a command of 10 to 20 acres, while 36 per cent of Vaishali GTWs are in this range. Generally, there is an inverse kind of relationship between the number of tubewell members and the size of the command in case of Deoria, while it is not so in case of Vaishali. In Vaishali, we notice an even sort of distribution and find a significant number of tubewells with large commands. The total land of the group members under the command of the Group Tubewells is 284.83 acres in Deoria and 409.29 acres in Vaishali. This means, on an average a GTW in Deoria commands 11.3 acres of members' land while its counterpart in Vaishali commands 16.3 acres of members' land.

Thus far we have been discussing the technical and other related features of GTWs. We now address ourselves to the question; who are the actual beneficiaries and to what extent the benefits of GTW programme have gone to those for whom the programme is intended? But before we start our examination, we would like to point out that non-members are those beneficiaries who are not members of GTWs but purchase water from the GTWs. From Table 9, we find that among the members of GTW about 72 per cent in Deoria and 74 per cent in Vaishali are drawn from the category of marginal farmers and about 33 per cent of non-members in each district are drawn from marginal farmers. Thus, in case of marginal farmers, whether members or non-members, the proportion is same in both the districts.

However, there are significant differences in two districts with respect to small and big farmers. In case of Deoria about 25 per cent of member beneficiary farmers are from small farmers and about 3 per cent from big farmers, while in Vaishali the percentage of small farmers is about 14 but that of big farmers is about 12. In case of non-members, about 3 per cent in Deoria and about 6 per cent in Vaishali from the category of big farmers enjoy the benefit of GTW irrigation. With respect to area also, there is no difference between the two districts as far as marginal farmers' category is concerned. Significant differences, however, exist if we take the other two categories, i.e., small and big farmers. In case of big farmers, about 9 per cent area is irrigated each by members and non-members in Deoria district. But in case of Vaishali big farmers irrigate about 21 per cent of the total irrigated area by members and about 17 per cent of area irrigated by non-members. This means that irrigation benefits of group tubewell have gone to bigger farmers to a greater extent in Vaishali in comparison to Deoria. This becomes much more obvious if we examine the overall figures. In Deoria, non-members constitute 59 per cent of the total beneficiaries and irrigate 63 per cent of the total area, while in Vaishali they constitute only 30 per cent of beneficiaries but they irrigate 52 per cent of the total area irrigated. The data, thus, not only show that Vaishali bigger farmers are greater beneficiaries of group irrigation but it also brings out the awkward fact that greater proportion of the total irrigated area in both the districts belongs to non-members rather than to members, which in other words means, that non-members are greater beneficiaries of group irrigation programmes compared to members.

This raises a further question : among the non-members, which category of farmers are greater beneficiaries in number as well as in area of GTW irrigation? Coming to the numbers first, we find that in both the districts it is the small farmers who are the greatest beneficiaries, constituting on an average about 8 beneficiaries per GTW in Deoria and about 5 in Vaishali. With respect to area also, it is the category of small farmers who are the biggest beneficiaries. They irrigate about 13 acres per GTW in Deoria and about 12 acres per GTW in Vaishali. This means that, although non-members are the greatest beneficiaries but among them it is the small farmers and not the big farmers who constitute the biggest beneficiaries. However, as regard the members, the greatest beneficiaries both in terms of numbers and the area irrigated, the marginal farmers are the greatest beneficiaries. In Deoria, they constitute about 6 members per GTW and irrigate about 6 acres per GTW, while in Vaishali they constitute about 12 members per GTW and irrigate about 10 acres per GTW. As regard the big farmers, they constitute a very small fragment of total membership, i.e., about one person per two GTWs in both the districts. However, they irrigate about 2 acres per GTW in Deoria and about 3 acres per GTW in Vaishali.

The other dimension of looking at the percolation of benefits is to examine the caste background of the beneficiaries because in India there is a coincidence of caste and class. Looking at the data from this angle, we find (Table 11) that in Deoria 71.46 per cent of beneficiaries are from the backward caste and 22.23 per cent from the higher caste. In case of

Vaishali the position is just reverse and 77.07 per cent beneficiaries belong to the high caste while 20.49 per cent are from the backward caste. The data again indicates that the programme in Deoria is oriented more to less privileged social groups than in Vaishali. However, no categorical judgement can be passed without the caste data of the larger areas where the programme is operating. It is possible that this data is just a reflection of the larger social reality in the two districts.

Another angle from which we need to examine the working of the group tubewells is in terms of their economic viability. One of the most common causes of the failure of cooperative and Panchayat tubewells, which were tried in U.P. in late fifties and early sixties, was non collection of dues, leading to disconnection or no proper and timely maintenance and repair leading to cannibalisation for parts by the Pradhans of Gram Sabha (Village Assembly) themselves.<sup>1</sup> In case of the present group tubewells (Table 12), the total annual income generated by these are Rs.98691.12 and Rs.113185.01 in Deoria and Vaishali respectively. The two sources of income are, water charges and thrasher charges. The major portion of income in both the districts comes from water charges. However, 5.78 per cent of total income in Deoria and 7.07 per cent of total income in Vaishali comes from thrasher charges. On an average a Deoria tubewell makes an annual income of Rs.3947.64, while its counterpart in Vaishali makes Rs.4527.40 annually. In case of both the districts, the major portion of expenditure is incurred on electricity/diesel. It consumes about 60 per cent of expenditure



in Deoria and 68 per cent in Vaishali. The expenditure under this head is higher in Vaishali because over 50 per cent (13) of tubewells are diesel operated compared to none in Deoria. The next major item of expenditure is maintenance and Deoria spends 28.14 per cent of expenditure on it compared to Vaishali's 20.28 per cent. In both the districts, the tubewells are generally running on profit although the margin of profit is slightly higher in Vaishali : Rs.1100 per year compared to Deoria's Rs.1083. Of the 50 tubewells, there is only one (in Deoria) running at a loss of Rs.215 per year.

Although the tubewells are generally running on profit but the position with respect to repayment of loan to the bank by tubewell farmers is rather depressing. Since repayment is expected after a year or two of the installation of the tubewell, we should examine only those tubewells which were installed upto 1981 (Table 13). If we do so, the number of tubewells installed upto that period comes to 38, each district with 19 tubewells. The position we find is that on an average, outstanding loan per tubewell comes to Rs.9406.40 for Deoria and Rs.13027.56 for Vaishali, which is 67.86 per cent of the total installation cost in Deoria and 73.11 per cent that of Vaishali. The average number of defaulters per tubewell comes to 7 for Deoria and 16 for Vaishali, which in terms of percentage comes to 76.26 for Deoria and 79.09 for Vaishali. The figures thus indicate a very high non paying propensity on the part of farmers. The various factors responsible for this state of affairs have already been dealt by us while discussing the GTWs in two districts in chapter II and chapter III.

### Management of Group Tubewells

The management of each tubewell is the joint responsibility of group farmers and the group leader. Let us see how these tubewells are managed and what norms and procedures have been set for their smooth functioning and successful working? In both the districts, differential rates of water charges for members and non-members are in operation although there are distinct variations in the rates in the two districts. For an electrically operated tubewell, the average water charge per hour for members works out Rs.1.98 for Deoria and Rs.2.20 for Vaishali. The rate for the members' land outside the command comes to Rs.4.17 for Deoria and Rs.4.20 for Vaishali. However, major differences are noticeable in the charges for non-members in the two districts. Non-members are charged at the rate of Rs.6.02 per hour in Deoria while their counter parts have to pay Rs.10 in Vaishali. Interestingly, there are marginal differences in the rates between members and non-members in diesel operated tubewells in Vaishali. Here the rates are, Rs.8 per hour for members, Rs.10 for members' land outside the tubewell command and, Rs.10.16 for non-members.<sup>2</sup>

As regard the method of collection of water charges, in majority of cases in both the districts, members pay after the crop selling/crop maturation and the non-members pay either on a monthly basis or at the time of taking water. Some times the members also pay on a monthly basis. In some cases we found very systematic accounting procedures worked out by the group leaders. For instance, in case of community tubewell No.8,



Majhauria village, Deoria, the group leader had worked out the details of a prior fixation for each group member - the duration of the right to water per week and the amount he was required to pay per month and it was working very well.

The basic principle concerning the distribution of water is that the water is given to members first then to non-members. For giving water, time duration is allocated to members in proportion to their land. Some times the time duration is fixed on a weekly basis, other times it is decided by mutual agreement and convenience of the group members. We found, conflict among group members was not a common feature of the community tubewells in the two districts. 64 per cent tubewells in Deoria and 68 per cent in Vaishali did not give an occasion for a conflict. However, conflict did arise in rest of the cases either about the distribution of water, caused generally because of electric failures and rostering of electricity/scarcity of diesel, or about the operation and maintenance of the tubewell and upkeep of field channels etc. The most common method used for resolution of conflicts is to call a group meeting and thrash out the issue/problem to a workable solution. The second most common method is to involve the VASFA and INADP officials in the meetings. On one occasion in each district, an erring unmending member was given the threat of cancellation of his membership by the rest of the members.

Some of the suggestions given by the group members for improving the management of the tubewell are : (i) proper maintenance of irrigation records and accounts in a record book to be examined by VASFA and INADP staff; (ii) provision of some training by VASFA/INADP to the group leader and the operator in the maintenance of irrigation records and accounts and operation of the tubewell; (iii) selection of the operator from among the literate persons so that he could maintain records properly; (iv) increase in the number of the mechanic and greater supervision and control over them by the INADP and VASFA authorities; and (v) formation of smaller groups for the proper functioning of tubewells (mentioned in Vaishali only).

### Problems

In the preceding, we discussed the salient features concerning the working of the community tubewells in two districts. We now turn to the problems associated with their working. In our survey, we asked the farmers to identify the three most pressing problems faced by them. Short supply of electricity either due to electric failure or because of rostering of electric supply was mentioned the first most pressing problem by Deoria farmers. On an average, they reportedly received electricity for about 4 hours per day during summer. Vaishali farmers, on the other hand, were equally divided in proclaiming the most pressing problem. About half the farmers mentioned short supply of electricity and the other half told about the acute shortage of diesel during the peak season. This is quite understandable consi-

dering the fact that 13 out of 25 tubewells are diesel operated in Vaishali. As regard the second most pressing problem, there is a unanimity among the farmers in two districts. In both the districts, the problem mentioned was the delay in repair of mechanical defects in the tubewell. One mechanic in each district has been provided by VASFA and INADP who apart from being irresponsible was thought to be grossly inadequate. With regard to the third most pressing problem, there was difference of opinion in the two districts. In case of Deoria, it was non payment of dues in time by the farmers while in case of Vaishali it was non maintenance of irrigation records and accounts properly.

Apart from these problems mentioned by the farmers, we also noticed some problems. These problems were more obvious and pronounced in Vaishali. The reason may be the experiment was first tried in Vaishali and by the time it was started in Deoria the INADP staff, most of whom came from Vaishali, had learnt the lesson well from the past experiences. In the initial stage when groups were being formed in Vaishali, some influential farmers also came in to groups. They managed to get the tubewells installed in their land and also became group leaders. These persons are creating problems by committing all kinds of irregularities and trying to deprive the other group members from getting the water. They also make it a point not to repay the loans, thus setting bad example for others. In some other cases, caste barriers are proving to be a handicap as the high caste and low caste people are not coming together

for working collectively for the common good. The recovery of bank loan is a very common problem in most of the cases. Recovery of the bank loans was not stressed in the initial stage to give farmers ample time to maximise their agricultural production and to repay the loan when they become prosperous. However, this initial complacency has made the farmer indulgent, non-appreciative of the role of the bank and he does not attach any importance to the repayment. He is having a mentality to treat the loan as a free gift and does not care to repay it. As a result, the bank loans have become sticky for years together, interest ever interest mounting the outstanding dues.

#### Notes and References

<sup>1</sup>For details, see, : (i) All India Review of Minor Irrigation Works based on State-wise Field Studies, Committee on Plan Projects, Planning Commission, Irrigation Team, New Delhi, June 1966, p.48; (ii) "Study of the Problems of Minor Irrigation", Planning Commission, New Delhi, 1961, quoted in "Irrigation for Very Small Farmers : Appropriate Technology or Appropriate Organisation?" P.B. Ghate, Economic and Political Weekly, Review of Agriculture, December 1980, p.A-176.

<sup>2</sup>In our sample there were 13 diesel operated tubewells in Vaishali but none in Deoria.

## CHAPTER V

### S u m m i n g U p

In a developing country like India, one of the major concerns of policy makers is to improve the socio-economic condition of small and marginal farmers. These farmers constitute a major portion of rural population and own a very small proportion of cultivated land. In our study, though we had discussed, the problems related to them in a broader perspective but we in the present study have concentrated on those small farmers who inhabit in the eastern part of Gangetic plains.

State intervention in the form of Small Farmers' Development Agencies (SFDAs) was made aiming at making preferential arrangements for the supply of inputs to small and marginal farmers. In the year 1978-79 this programme underwent a conceptual change and with modifications it is called Integrated Rural Development (IRD) programme. This programme had started because it was felt that various developmental programme operated through multiple agencies were not fruitful. Therefore, a single integrated programme operative throughout the country had started in the form of IRD programme. In spite of these state interventions for the betterment of socio-economic condition of the small and marginal farmers, they remain more or less in same condition due to mainly poor implementation of the new programme. The Programme Evaluation Organisation (PEO) of Planning Commission which evaluated the SFDA and MFAL (Marginal Farmers and Agricultural Labourers)



programmes found that proper care had not been exercised in the selection of some of the project areas and the process of identification of the beneficiaries was also slow in most areas. It also found that benefits of both the programmes accrued to wrong persons to the extent of 9 per cent in each programme. Even awareness regarding these programmes among target groups was found very low.

Thus, the IRD programme is no different from the earlier operating programmes as far as the percolation of benefits of the schemes to the intended beneficiaries is concerned. There is a widespread feeling that the benefits had gone into wrong persons (affluent section of the rural society) and the real needy section of rural society is deprived of the benefits though they deserve it most.

Coming to the area of our study, we find there is preponderance of small and marginal holdings in Uttar Pradesh, Bihar and West Bengal which constituted major portion of East Gangetic Plains. Although the three states together contain about 39.47 per cent of the total operational holdings in India, their share of small holdings is much bigger. The three states together contain about half (50.50 per cent) of the marginal holdings (upto 1 hectare) and about 46.50 per cent of small (upto 2 hectare) holdings of the country. As a result of preponderance of small and marginal holdings in the three states, the average size of the holdings is quite small, being 1.05 ha. in U.P., 1.11 ha. in Bihar and 0.99 ha. in West Bengal compared to the all India average of 2.00 ha.



This brings us to the question of sources of irrigation in the region and the desirability of a proper mode of irrigation which could serve the very small farmers of these states. Although the net work of major and medium canals is spread all over the region, the unreliability of water in terms of adequacy and timings hits the small farmers hardest. Further, the traditional modes of surface irrigation, i.e., rainfed ponds and tanks are losing importance on account of neglect and non-maintenance by the state governments. Ground water the other important source of irrigation, is in abundance in the states forming part of the Indo-Gangetic plains. However, within the Indo-Gangetic plains, the development of tubewell irrigation in the eastern region is much less compared to its western counterpart. Further, whatever little development has taken place in the eastern region, the tubewell water is out of reach of small farmers in case of private as well as state on account of high investment cost involved in case of private and the prevailing socio-economic power structure in villages in case of state tubewells.

Therefore, a well directed effort to make the benefits of ground water available to the small farmers is the most urgent need of the hour. One of the solutions suggested is the attainment of a high level of efficiency in state tubewells so that water can be delivered to small and marginal farmers at a cost below the cost of traditional irrigation. But it is difficult to succeed in this objective in the light of the working of public sector enterprises in general, and state tubewells in particular.

The power shortage, mechanical defects and decreasing discharge force lead to a short supply of water through these tubewells. As a consequence, water became a valued scarce resource, therefore, its distribution is also skewed in favour of richer and bigger farmers.

A variant of the state tubewell with lots of technological perfection in the distribution system to serve the interest of small farmers with the World Bank support is being tried in U.P. In spite of all the claims of its successful working the observation of two tubewells visited by the senior author reveal that these tubewells are also ridden with problems. It was found that the supply of electricity was only 6 to 8 hours per day and "Warabandi" was not adhered to by the farmers because the consolidation of land holdings had not taken place in the tubewell commands. The experience suggests that technology is a means and not an end itself. Innovation of technological solutions without due regard to institutional factors necessary for the success of technology is to indulge in a target achievement oriented ritualism rather than working on a problem solving strategy.

Keeping in view the discussion in the preceding and the poverty and land holding pattern of the east Gangetic plains, the group tubewell is the most logical choice for the small farmers of this region. In this region, private tubewell is not an economically viable proposition as the holdings are small and unconsolidated. However, a tubewell becomes economically viable and practically possible if it is owned by a

group of small farmers having contiguous holdings in this region of abundant ground water. In the districts of Vaishali (Bihar) and Deoria (U.P.), group tubewells installed with the help of voluntary organizations and owned collectively by groups of small and marginal farmers are doing a very satisfying job.

The brain behind the GTW was late J.C. Mathur who was ably helped in executing the scheme by K.D. Dewan with whose efforts was born Vaishali Area Small Farmers' Association (VASFA) in 1971. VASFA works in collaboration with Peoples Action for Development, India (PADI) and the Central Bank of India. Initially it received a grant of Rs.400 thousand from the Government of Norway. It has its own executive committee of elected and nominated persons and a Project Coordination Committee of government officials. The main objective of VASFA is to organise small farmers for multifarious agricultural activities and to manage loan for group tubewells, agricultural machines, godowns and plant protection apparatus. During the last 12 years of its functioning, VASFA has organized 36 groups, each with a group tubewell covering a membership of 650 farmers.

After reviewing the success of group tubewells in Vaishali, the PADI officials thought of replicating the programme elsewhere. Deoria district in U.P. like Vaishali was marked by preponderance of small and marginal farmers, very small and fragmented landholdings and extreme poverty. But it had like Vaishali abundance of available ground water. Keeping in view these similarities, Deoria district was thought to be a natural choice. Therefore,

the programme  
 /was started by PADI in Deoria district in the year 1974 under the "Indo-Norwegian Agricultural Development Project" (INADP). The execution of the project at the district-level was vested in the Project Implementation Committee (PIC), a registered society created for this purpose. The execution of plans formulated by PIC is the responsibility of PADI Project-in-Charge. The financial assistance for the working of the project was provided by Norway in the form of a grant of Rs.500 thousands to be transmitted through PADI. During the last nine years, the programme has covered 19 villages of Deoria block organizing 35 groups benefiting 450 member farmers and 600 acres of land. Out of 35 group tubewells 2 are dieselized and the rest are electrified. Although the area to be covered by the project is three blocks, the work so far has been confined to Deoria block alone.

The process involved in the installation of group tubewell at both the places namely, Vaishali and Deoria, are same. The village selection is done on the basis of incidence of small and marginal farmers. In the area delimited for the community tubewell work, the officials of INADP and VASFA approach the small and marginal farmers and persuade them to obtain the benefits of joint tubewell. The first step in this direction is the formation of groups of small and marginal farmers. Generally farmers having land over 5 acres are not included, however, sometimes their inclusion is unavoidable on account of the location of their land. The members of the group should have contiguous land so that it could be commanded by a joint tubewell. One of the member farmers in each group has to donate .02 acres



of the land for the installation of the tubewell. The group members elect one of them as group leader. Each farmer furnished a copy of the official record of the total land owned by him and enters in an agreement to abide by the terms and conditions set by VASFA and INADP. The papers are then submitted to the loaning bank (Central Bank of India) and the necessary amount is withdrawn from the revolving fund for the construction of tubewell cabin, installation of pumpset, energization and construction of field channels. After the completion of these works, the total cost is distributed among the group members in proportion to the area of their land under the tubewell command. The members at this stage enter into a direct agreement with the bank, according to which the amount is treated as term loan borrowed by the individual farmer from the bank. Each farmer is required to pay his loan with interest in five years in six monthly instalments. There is also a provision to recover the loan from one-tenth of the crop of the farmers but it could not come into practice in the two districts due to lack of the staff.

The group leader manages the functioning of tubewell with the help of group members and VASFA officials (in Vaishali) or INADP staff (in Deoria). In both the places, the management of a tubewell covers water distribution, operation, maintenance and repair of tubewell and field channels, maintenance of irrigation records and income-expenditure accounts, etc. For water distribution, time is allotted to each group member as per share of their land in the command in both the places. In both the



places, the members' land under the command of GTWs gets water first, followed by their land outside the GTW command and then to non-members' land. In both the districts, the irrigation records are maintained by the operator who generally is the group leader himself or one of his family members. Generally conflicts do not arise in any of the districts but in the event of occurrence are resolved by group meetings. Some times VASFA and INADP officials are also involved in group meetings. The water charges are fixed by the group leader in consultation with his group members and vary from one group to another even within a district.

The group tubewells in Vaishali and Deoria are functioning well and are running in profit. Nevertheless, there are some problems and obstacles which may jeopardize their future development. The attitude of beneficiary farmers not to pay the dues, to the loaning bank in both the places is a very serious problem and is not conducive for the further development of the group tubewells. The main reason for the non-paying attitude of the farmers is said to be the expectation of subsidy (under IRD programme). Since some of the farmers in Deoria have actually been benefited by the subsidy, the others, including those whose GTWs were installed before 1980 are disinclined to repay the loan hoping that they might also get a subsidy. Vaishali tubewells are lagging far behind Deoria in the matter of subsidy. Here only one of the tubewells studied by us and installed in 1982 has so far received the subsidy. The two main reason for this lag in Vaishali are : first, that most of the tubewells

were installed before 1980 and second, the implementation of the provisions of the IRD in Bihar is rather slow.

The problems created by the inclusion of big farmers in the GTW remains in Vaishali. However, in case of Deoria, INADP staff took care to exclude big farmers because they were well aware of the hindrances created by these farmers. The maintenance and repair of group tubewell is also an acute problem in both the districts. VASFA and INADP both have appointed only one mechanic in each district and he has to attend all the tubewells installed by them. As a result, in the event of mechanical defects his ready availability is a common problem in both the places.

In June 1983 we conducted a survey in the areas where GTWs are installed in the two district to have a better understanding of their functioning. The important findings of the survey are as follows :

In Vaishali, we find the development of GTWs is very speedy in the first two years when 72 per cent of the existing GTWs are installed and then there is a lull of several years before another GTW is installed. In Deoria, on the other hand, the development is more or less uniform. As regard the technical features of the GTWs; the average depth and the horse power of the GTWs is higher in Vaishali compared to Deoria but the average discharge is more or less the same. On the other hand, the model values of the size, depth and discharge of the GTWs in the two districts is same, although the model value of the horse power is again higher in Vaishali compared to Deoria. The average cost

of a Deoria GTW is slightly lower than that of Vaishali. The differences in the two districts are also noticeable with respect to the group size of tubewells. On an average, there are about 8 members per GTW in Deoria, while there number swells to 16 per GTW in Vaishali. The tubewell commands are also larger in Vaishali compared to Deoria. On an average, a GTW in Deoria irrigates 11.4 acre land of the group members' compared to it's Vaishali counterpart which irrigates 16.7 acre of members' land.

One of the most important objective of our study was to examine the performance of GTWs in terms of percolation of irrigation benefits to the small and marginal farmers in the two districts. From our data we find that among the members 97.08 per cent beneficiaries in Deoria are marginal and small farmers and 91.16 per cent of members' land is irrigated by them. In Vaishali, 88.30 per cent of members are marginal and small farmers having 79.32 per cent of members' land commanded by the tubewells. As regard the big farmers (above 5 acres of land), they constitute 2.92 per cent of membership and irrigate 8.84 per cent of land in Deoria and 11.76 per cent of membership and 20.68 per cent of land in Vaishali. Thus, among the members, the major beneficiaries of the programme are small and marginal farmers in the two district. However, among the total beneficiaries it is the non-members who eat the greater portion of the cake. In Deoria, the non-members constitute 59 per cent of the total beneficiaries and irrigate 63 per cent of the total area, while in Vaishali they constitute only 30 per cent of beneficiaries but they irrigate 52 per cent of the total area irrigated.

Looking at the beneficiaries from the caste angle also we find in Deoria a much larger proportion of the beneficiary members is drawn from the backward caste (71.46), while reverse is the case of Vaishali where only 20.49 member beneficiary farmers are drawn from the backward castes. Our data thus clearly reveals two things : first, the programme in Deoria is oriented more to less privileged social groups in comparison to Vaishali; second, that non-members are greater beneficiaries of GTW programme compared to members.

Our survey also reveals that although the tubewells are generally running on profit but the position with respect to repayment of loan to the bank by tubewell farmers is rather depressing. The recovery of bank loan is a very common problem in both the districts and is accentuated on account of a subsidy given 10 GTWs in Deoria.

The management of each GTW with respect to distribution of water, maintenance of field channels and resolution of conflicts is the joint responsibility of group farmers and the group leader. Sometimes, particularly, in cases of conflict resolution, the assistance of VASFA and INADP staff is also utilised. The three most pressing problems mentioned by the farmers are : first, short supply of electricity either due to electric failure or because of rostering of electric supply. In Vaishali, about 50 per cent of farmers mentioned acute shortage of diesel as the first problem. Second, delay in repair of mechanical defects in the tubewell. Third, in case of Deoria it was non-payment of dues in time by the users and

in case of Vaishali it was maintenance of irrigation records and accounts properly.

No doubt, some of the problems do remain but group tubewells have done quite a good job for the poor farmers of two economically backward regions marked by characteristics jeopardising the prospect of investment in private tubewell. VASFA and INADP have not only helped small and marginal farmers in getting access to irrigation water but have also helped these farmers in getting individual bank loans for meeting their various other agricultural requirements or in providing them a subsidiary source of income, i.e. dairy development. The poor farmers are thus helped in getting rid of the clutches of local mahajans (money lenders). As regard the tubewells, the problem of collection of material for construction is solved and the farmers are provided with the technical facilities. Under the supervision of PADI, there is a separate unit with three rig machines and other implements which constructs tubewells in the two districts.

One of the major concerns of the policy makers in recent years has been the percolation of the benefits of the various schemes and programmes to the rural poor. By their own admission, "because of leakages in delivery system and ineffective administration, rural programmes fail to improve the distribution of income" (Draft Five Year Plan, 1978-83, Government of India). As pointed out in the preceding, the beneficiaries of the government programmes meant for the rural poor are not the ones who deserve it most. Judging from this angle, the Deoria and



Vaishali experiment is extremely successful in benefiting the small and marginal farmers. On the basis of our study we can say, if care is taken in the formation of tubewell groups and proper kind of leadership is developed, the concept of group tubewell is bound to succeed. The chances of its adoption by small and marginal farmers in India are very good considering their resourcelessness and 50 per cent subsidy on capital cost of community tubewells under the IRD programme. The prospect of the extension of the experiment in similar other areas appear to be bright. Seeing the success of the scheme in the two districts, Denmark International Development Agency (DENIDA) has entered in the field since December 1978. It has funded (through PADI) rupees ten million for 15 on-going projects in the districts of Vaishali, Muzaffarpur, East Champaran, West Champaran (North Bihar), Deoria and Gorakhpur (East U.P.). Each project is being granted a sum of rupees 600 thousands for this purpose. The Agency plans to add 30 new projects in the scheme. Under the on-going DENIDA scheme, 167 community tubewells had been installed in 14 projects in Bihar till May 1982.

Table 1 : Year-wise Number of Tubewells Installed  
in Two Districts

Year	Number of Tubewells Installed in	
	Deoria	Vaishali
1971	-	10
1972	-	16
1973	-	5
1974	1	-
1975	5	3
1976	4	-
1977	1	-
1978	-	-
1979	1	-
1980	5	-
1981	11	-
1982	5	1
1983	3	1
Total	36	36

Table 2 : Size and Depth of Tubewells in Two Districts

Number of Tubewells and Their Depth									
Size	Upto 50 feet		50.01-100 feet		100.01-150 feet		Above 150 feet		Total
	Deoria	Vaish- ali	Deoria	Vaish- ali	Deoria	Vaish- ali	Deo- ria	Vai- shali	
4" x 3"	1	-	-	-	-	-	-	-	1
4" x 4"	3	1	2	5	5	12	-	1	29
5" x 3"	-	-	2	-	3	-	-	-	5
5" x 4"	3	-	1	-	4	-	-	-	8
6" x 4"	-	1	-	-	1	3	-	1	6
7" x 4"	-	-	-	1	-	-	-	-	1
Total	7	2	5	6	13	15	-	2	50

Table 3 : Horse Power and Discharge of Tubewells in Two Districts

Discharge per Hour (in Gallons)											
Horse Power	Upto 5000		5001-7500		7501-10000		10001-12500		12501-15000		Total
	Deoria	Vaishali	Deoria	Vaishali	Deoria	Vaishali	Deoria	Vaishali	Deoria	Vaishali	
3	1	-	-	-	-	-	-	-	-	-	1
5	-	-	9	6	4	2	-	-	-	-	21
6.5	-	-	-	-	-	3	-	-	-	-	3
7.5	-	-	-	4	8	6	2	-	-	-	20
8	-	-	-	-	-	1	1	-	-	-	2
10	-	-	-	-	-	-	-	1	-	2	3
Total	1	-	9	10	12	12	3	1	-	2	50

Table 4 : Average Horse Power, Depth and Discharge of Tubewells in Two Districts

	Deoria	Vaishali
1. Average Depth	92'	112'
2. Average Horse Power	5.8	6.9
3. Average Discharge (in Gallon)	8540	8320

Table 5 : Model Values of the Size, Depth, Horse Power and Discharge of Tubewells in Two Districts

	Deoria	Vaishali
Model Size	4" x 4"	4" x 4"
Model Depth	100' to 150'	100' to 150'
Model Horse Power	5	7.5
Model Discharge	7501 - 10000	7501 - 10000

Table 6 : Cost of Tubewells in Two Districts

Cost (in Rs.)	Number of Tubewells		Total
	Deoria	Vaishali	
Below 10000	2 (8.00)	10 (40.00)	12 (24.00)
10000 - 15000	12 (48.00)	5 (20.00)	17 (34.00)
15001 - 20000	10 (40.00)	3 (12.00)	13 (26.00)
Above 20000	1 (4.00)	7 (28.00)	8 (16.00)
Total	25 (100.00)	25 (100.00)	50 (100.00)

Table 7 : Group Size of Tubewells in Two Districts

Group Size	Number of Tubewells		Total
	Deoria	Vaishali	
Less than 5 members	3 (12.00)	2 (8.00)	5 (10.00)
5 - 9 members	13 (52.00)	6 (24.00)	19 (38.00)
10 - 15 members	8 (32.00)	4 (16.00)	12 (24.00)
16 - 25 members	1 (4.00)	10 (40.00)	11 (22.00)
Above 25 members	- -	3 (12.00)	3 (6.00)
Total	25 (100.00)	25 (100.00)	50 (100.00)

Table 8 : Command Size of Tubewells in Two Districts

Command Size	Number of Tubewells		Total
	Deoria	Vaishali	
Less than 10 acres	15 (60.00)	8 (32.00)	23 (46.00)
10.00 - 20.00 acres	6 (24.00)	9 (36.00)	15 (30.00)
20.01 - 30.00 acres	4 (16.00)	6 (24.00)	10 (20.00)
Above 30.00 acres	- -	2 (8.00)	2 (4.00)
Total	25 (100.00)	25 (100.00)	50 (100.00)



Table 9 : Information about Number and Area Irrigated by Member and Non-member Farmers in two Districts

Information	Deoria		Vaishali	
	Member	Non-member	Member	Non-member
No. of beneficiary marginal farmer	148 (71.84)	98 (33.22)	304 (74.15)	69 (32.86)
No. of beneficiary small farmer	52 (25.24)	189 (64.07)	58 (14.15)	128 (60.95)
No. of beneficiary big farmer	6 (2.92)	8 (2.71)	48 (11.70)	13 (6.19)
Total No. of beneficiary farmers	206 (100.00)	295 (100.00)	410 (100.00)	210 (100.00)
Area of beneficiary marginal farmers irrigated	150.20 (52.73)	104.02 (21.75)	220.85 (53.96)	78.23 (17.52)
Area of beneficiary small farmers irrigated	109.46 (38.43)	330.67 (69.15)	103.79 (25.36)	291.55 (65.29)
Area of beneficiary big farmers irrigated	25.17 (8.84)	43.52 (9.10)	84.65 (20.68)	76.75 (17.19)
Total area of beneficiary farmers irrigated	284.83 (100.00)	478.21 (100.00)	409.29 (100.00)	446.53 (100.00)

Figures in parantheses indicate percentages

Note : Marginal farmers are those having land upto 2.5 acres, small farmers are having 2.6 to 5 acres of land and big farmers are the ones with above 5 acres of land.

Table 10 : Average Number and Area Irrigated by Member and Non-member Farmers in Two Districts

Item	(Area in acres)			
	Deoria		Vaishali	
	Member	Non-Member	Member	Non-Member
Av. no. of beneficiary marginal farmers per GTW	5.9	3.9	12.2	2.7
Av. no. of beneficiary small farmers per GTW	2.0	7.6	2.3	5.1
Av. no. of beneficiary big farmers per GTW	0.2	0.3	1.9	0.5
Av. no. of beneficiary farmers per GTW (Total)	8.2	11.8	16.4	8.4
Av. area of marginal farmers irrigated per GTW	6.0	4.2	9.8	3.1
Av. area of small farmers irrigated per GTW	4.4	13.2	5.2	11.7
Av. area of big farmers irrigated per GTW	1.0	1.7	1.6	3.1
Av. area of beneficiary farmers irrigated per GTW	11.4	19.1	16.7	17.9
Per cent of members' land irrigated to their total land	73.71		42.84	

Table 11 : Caste-wise Number of Members in Two Districts

Caste	Number of Members			
	Deoria		Vaishali	
High Caste	46	(22.23)	316	(77.07)
Backward Caste	147	(71.46)	84	(20.49)
Scheduled Caste	9	(4.37)	6	(1.46)
Muslim	4	(1.94)	4	(0.98)
Total	206	(100.00)	410	(100.00)

Table 12 : Installation Cost, Annual Income and Expenditure of Tubewells in Two Districts

Items	(Rs.)	
	Deoria	Vaishali
1. Total installation cost	351796.90	388279.04
2. Average installation cost per tubewell	14191.88	15531.16
3. Gross Income	98691.12	113185.01
4. Average gross income per tubewell	3947.64	4527.40
5. Expenditure on :		
a. Electricity/diesel	42758.00 (59.70) *	59014.83 (68.00)
b. Operation	2400.00 (3.35)	3120.00 (3.50)
c. Maintenance	20150.00 (28.14)	17600.00 (20.28)
d. Miscellaneous	6300.00 (8.01)	7050.00 (8.12)
e. Total expenditure (a+b+c+d)	71608.00 (100.00)	86734.83 (100.00)
6. Average expenditure per tubewell	2864.32	3616.03
7. Net income (3 - 5 e.)	27083.12	26400.18
8. Average net income per tubewell	1083.32	1056.01

\*Figures in parantheses indicate per cent expenditure on different items to total expenditure.

Table 13 : Informations about Outstanding Loan and Defaulters for the Group Tubewells Installed upto 1981

Informations	Deoria	Vaishali
1. No. of tubewells installed upto 1981	19	34
2. Total outstanding loan (Rs.)	170721.66	247523.64
3. Average outstanding loan per tubewell (Rs.)	9406.40	13027.56
4. Per cent of outstanding loan to total installation cost	67.86	73.11
5. Total number of defaulters	130	295
6. Average number of defaulter per tubewell	7	16
7. Per cent of defaulters per tubewell	76.26	79.09